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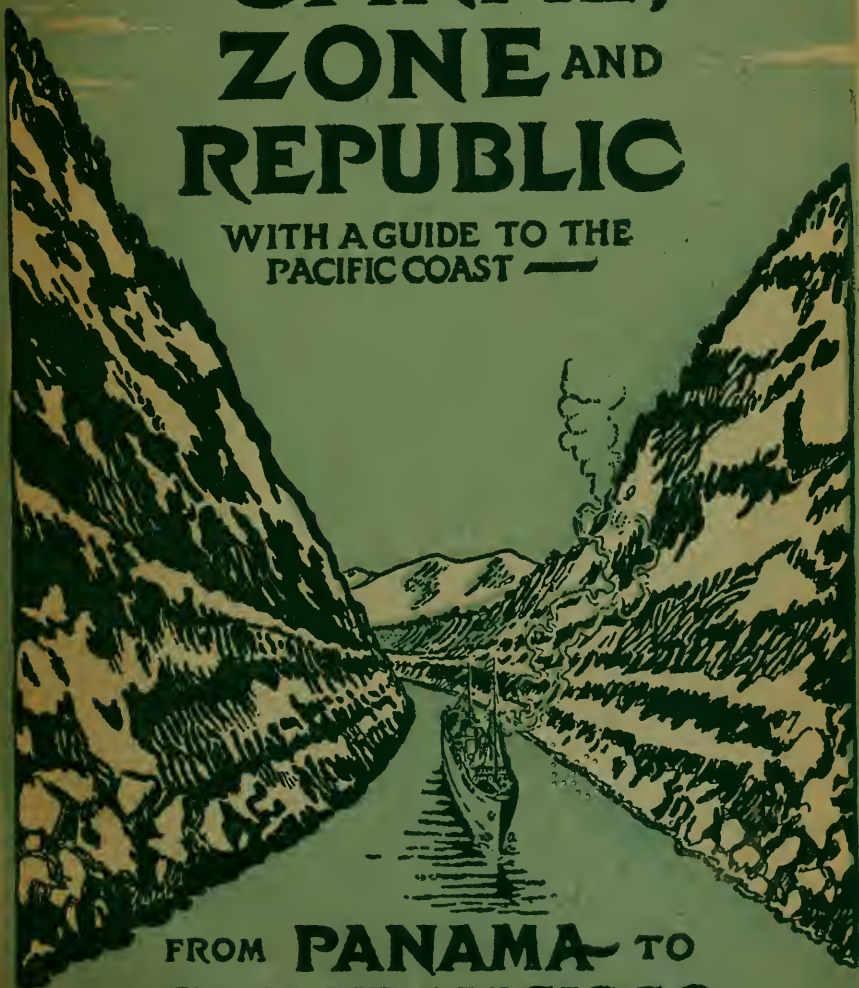


PANAMA

A TEXT BOOK ON THE

CANAL, ZONE AND REPUBLIC

WITH A GUIDE TO THE
PACIFIC COAST —



FROM PANAMA TO
SAN FRANCISCO.

PRICE ONE DOLLAR

Panama

522
997

A GUIDE
TO THE PACIFIC COAST
FROM PANAMA TO
SAN FRANCISCO
IN PICTURE AND WORD



BY
Charles Walker Burriss

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KANSAS CITY, U. S. A.

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and. Oct. 7, 1912.

WHEN I am in Rome, I fast
as the Romans do.
When I am at Milan, I
do not fast.

So likewise you, whatever
church you come to, observe the
custom of the place, if you would
neither give offense to others
nor take offense from them.

—St. Ambrose's Advice.

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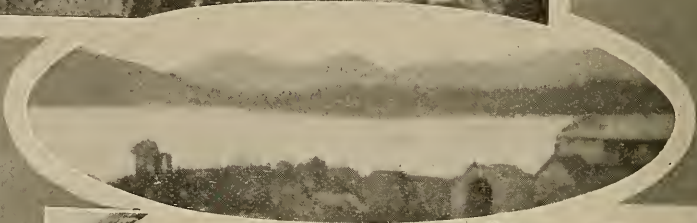
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Panama.



"The Invasion"—Showing the Author and His Favorite Methods of Attack on Land and Sea. The Middle Picture Shows a Typical Central American Landscape.

FORE-WORD

As in ancient times "all roads led to Rome," so, in the present day, all roads lead to the Isthmus of Panama, where the successful result of the world's greatest engineering work is located.

In issuing this Text Book, it is the purpose of the author to make it as complete in detail and general information as is possible for a publication of such broad scope. All information and facts herein given will be found correct and reliable. Careful attention has been given to all details, and the reader may depend upon the accuracy of the facts as stated.

In proof of the author's disposition to garner and to present, within the covers of this little volume, the essence of all available information properly pertaining to his subject, he presents the following prided credentials, in conclusion:

"AT SEA, February, 19.....

"To the Passengers of S. S.:

"Your committee appointed to inquire into the sanity of our fellow-passenger, Charles Walker Burriss, en route from Panama to San Francisco, beg leave to make the following report and respectfully suggest that the subject be presented with a copy of the same and that he be further assured of our unqualified support, should necessity arise."

REPORT OF THE COMMITTEE.

"To the World at Large:

"Be it generally known that we have had the extreme pleasure of meeting Col. Charles W. Burriss, U. S. A.

"We have observed his maneuvers, seen his smiles, and heard his laugh; listened to his jokes, told him others not half so good and heard him laugh again, and everybody else heard him, too. He enjoys a smile, admires a grin, loves a giggle, but adores a laugh, for when he smiles he laughs by wireless.

"He is the closest observer we have ever seen, for he has not missed a point of interest or otherwise from the Canal Zone in Panama to the Golden Gate in California. No gulf, bay or inlet has escaped his binoculars. Every volcano, active, dead or sleeping, has been observed by him; all mountain chains and ranges, peaks and pinnacles have met his gaze. He has not missed a meal since he embarked nor has he been sick a minute en route. He retired the latest and arose the earliest of all the passengers aboard.

"All through the voyage he has studied the history, language, customs, habits, politics and peculiarities of the people; the geography, topography, geology, fauna and flora of the country.

"He has also studied navigation, astronomy, meteorology, seismology, weather readings, deep sea soundings, wave motions,

air currents, steamer oscillations and vibrations, deck pedestrianism, wigwagging and night signaling to passing vessels and revolutionists ashore.

"His appetite has always been fine, his countenance pleasing, his appearance becoming and his behavior good. He has helped the helpless, nursed the sea-sick, cheered the charming, and chummed the cherry-colored senoritas that visited the ship. He landed at all ports, regardless of suds or surf, to pay his respects to the U. S. Consuls, barter with Chinese merchants, interrogate the Commandantes and interview the Jefe Politicos on the condition of the country and the prospects of the people.

"He is a remarkable tropical globe trotter, a strenuous Isthmian Canal advocate, a Progressive American and a patriotic Citizen, proud of his Country, his State, Village, Home, Family, and Friends.

(Signed) ".....
 ".....
 ".....

(Members of the Committee.)

"ADOPTED unanimously in committee of the whole, February, 19.....

(Signed) "....."
 (Chairman.)



"AT SEA, February, 19.....

"This is to certify that Mr. Chas. W. Burriss was a passenger on the S. S. '.....' from Panama to San Francisco, and that he conducted himself in an agreeable, intelligent and gentlemanly manner by being obedient to the officials, courteous to the employes, kind to the passengers, a friend of the revolutionists and a sympathizer with the governments. He has been healthy during the voyage, temperate aboard, sober ashore, active en route and strenuous in port. He has eaten his share, never bothered the doctor, asked all kinds of questions, told numerous old jokes and very few new ones, and he has laughed heartily and almost painfully at everything funny, ridiculous, serious and sympathetic since he came on the ship.

(Signed), Captain."

"He wanted to show me how to work sailors and paint ship. He said he was from Missouri.

(Signed), 1st Officer."

"I had the pleasure of showing him how to shoot sharks.

(Signed), Chief Engineer."

"He has not taken or passed any bad money that I know of.

(Signed), Purser."

"He only needs his nerve extracted, his cheek amputated, and his gall cut out to make him a desirable citizen.

(Signed), Surgeon."

"He told me he had been an express messenger, but he knows nothing about freight.

(Signed), Freight Clerk."

"He claims he is from Missouri, but I think I saw him painting a town in Kansas during Carrie Nation's absence.

(Signed), Storekeeper."

"He was my star boarder. He had no favorite dishes; he ate everything.

(Signed), Chief Steward."



Map of North, Central and South America, showing Steamship Routes.

STEAMSHIP ROUTES TO PANAMA.

There are choice of several Steamship lines offered the traveler to the Canal Zone and beyond. The four principal lines are:

- 1st. Panama Railroad Steamship Company.
- 2d. The United Fruit Company.
- 3rd. Hamburg-American Steamship Line.
- 4th. Royal Mail Steam Packet Company.

Panama Railroad Steamship Company.

The Panama Railroad Steamship Company is the United States Government line with general offices at New York City. The boats of this line make no intermediate stops in their six days' passage between New York and Colon on the Canal Zone. They pass Watlings Island—the first land discovered by Columbus—the east end of Cuba, skirting that island for several hours, in sight of the two western points of Hayti, and then sail directly across the deep blue waters of the Caribbean Sea for six hundred miles to the Port of Colon. They are United States Government vessels, not looking especially for passengers, yet giving them good service in transportation and ship facilities. Special rates may possibly be made by this line in connection with the Pacific Mail Steamship Company, from Panama City to San Francisco.

The United Fruit Company.

Ships of the United Fruit Company sail from all the Atlantic and Mexican Gulf ports and also from certain European ports. They make a feature of the comfort of passengers and can be depended upon for good service, saving of time and delivery to specified locality.

The German Lines.

The German vessels sail from New York City to the most interesting points in the Caribbean, including the Canal Zone. One makes the complete Caribbean cruise, returning to the port of departure in the original vessel. The surroundings are of the best. The management caters especially to the comfort and pleasure of the passengers.

Lastly, ships making direct sailings from home ports to and through the Canal and on up the Pacific Coast to San Francisco.

Information concerning any of these lines can be gotten at your home railroad ticket office.

The sailing time from Mexican Gulf ports to Colon is four days, while ships leaving New York for Colon require twenty-four to thirty-six hours longer.

STEAMSHIP ROUTES—(Cont'd).

The ocean voyage is made with fewer discomforts and with less danger from storms and other unpleasant features of the sea in the winter season than in the summer. The winter season in the temperate zone corresponds with the dry season of the Canal Zone, and will be found much more comfortable for travel than the summer, or wet season.

The author suggests travel arrangements that will allow from six to twelve days on the Isthmus before proceeding on the journey. The sights and scenes are so numerous, so strange, and of such magnitude that the tourist should allow himself time to grow to them, if he would fully appreciate them.

Provided the time allotted is sufficient, and if your itinerary is from coast to coast, and dignity rather than dispatch your disposition, it is desirable to allow five or six days for the run to Colon, six to twelve days on the Isthmus, and probably four weeks for the coast portion of the trip. Select the moonlight nights for the interesting portion of your movements, thereby doubling your eyesight.

In engaging passage for the local boat along the Central American coast, if possible engage your stateroom on the starboard or land side of the vessel. There will be nothing to see from the water side but expanse of water.

Steamer chairs may be rented for one dollar per voyage, and are almost a necessity to comfort. Don't forget the most important rule for successful travel—good nature. A pleasant face and pleasant speech will pave the way to the good will of fellow-passengers, ship's crew or the inhabitants ashore, and the combination will bring you in return much additional comfort and pleasure.

STEAMSHIP RATES.

The Caribbean cruise steamer fare from the Atlantic or Mexican gulf ports to the principal ports of interest on the Caribbean, including Panama and return, ranges from \$85.00 to \$125.00. This includes all expenses of cabin and table service.

The rate from New York to San Francisco via the Panama Railroad Steamship Company and Pacific Mail Steamship Company, including the railroad transportation across the Isthmus, also meals on shipboard—all first class—will range around \$120.00.

Counting one week on the Atlantic, and four weeks on the coast voyage on the Pacific, or a total of five weeks' transportation and board, this expense can not be considered excessive.

HOTELS ON THE ISTHMUS.

The hotels, both along the line of the Canal and in Colon and Panama City, will be found to satisfy. The traveler has the choice of two very different manners of entertainment. At all important localities along the Canal and in each Panaman city, will be found a hotel conducted by the Canal Commission. The rate will be found to be usually reasonable—fifty cents per meal as a rule. At Colon is located the New Washington Hotel and at Ancon, on the Pacific side, is the Tivoli Hotel. These two hotels are Commission hostleries and are all that can be desired. In fact, the combination of elegant rooms and cuisine, with the romantic and picturesque surroundings, combine to make a few days' location at either of these last named hotels a most pleasant reminiscence. Because of the uncertainty of traveling and to be sure of entertainment upon arrival, it will be good policy to cable to the management of the hotel at which you wish entertainment, making your reservations, as they frequently entertain capacity houses.

The native hotels of Colon can hardly be so well spoken of, but at Panama City can be found good accommodations. The Central Hotel at Panama City is typical of tropical satisfaction, the Sunday evening dinner being the special society event of the week; reserved tables, ten to twelve courses on a French bill-of-fare, served by Spanish waiters (no English spoken), an orchestra in the palm room and the national band playing in the plaza, adding eclat to the rarity of the evening's enjoyment. The hotel, old cathedral, old canal headquarters and bishop's residence surround the plaza. The movement of the international members of the audience, as they parade to and fro in the plaza enjoying the occasion, all form a picture not to be forgotten.

In cabling for reservations at the New Washington Hotel at Colon or at the Tivoli Hotel at Ancon, it would be well to specify reservation of rooms fronting on the water, as they are more pleasant and afford a magnificent view of the ocean.

THE GREAT AMERICAN SYSTEM OF TIPPING.

While the author does not believe in the Great American System of tipping, yet a little money judiciously placed will add materially to the traveler's comfort at sea as well as on land. Of the two extremes, as designated by over paying or refusing to pay for services rendered, it would seem best to chance erring a little in favor of the former. Good-natured, quick service in the line of little things which add to comfort should be appreciated and no well-meaning person would feel his books were closed if they failed to balance.

SEA SICKNESS.

Sea sickness is nausea resulting from the pitching or rolling of a vessel.

There seems to be no known specific for this sickness. Many recipes might be given, none of which are worth more than the mention. Sucking a lemon, chewing gum, putting cotton in the ears, light eating, no eating, or "eat as you please," will be among the advices given you by experienced travelers.

Cotton in the ears has scientific friends, who say there is a close connection between the fluids of the inside ear and the movements of the ship and that the double effect causes the sickness. A piece of ordinary brown wrapping paper placed over or next to the abdomen has been declared to be absolutely effective in preventing the trouble. Apparently sensible people have been known, who would not travel on a railroad train without being protected by a piece of brown paper so placed.

After all is said, the following advice would seem to be apropos,—Keep as much as possible in the open air, stay on deck and away from the close atmosphere where the sickness exists. It is contagious, in-so-far as sight and smell are concerned. Don't worry, get your mind occupied by some interesting subject or your surroundings and *forget the fear*. Eat lightly for a day before going aboard ship, and continue this during the voyage. Stay on deck if possible, even if you feel the sickness,—as the clean, pure air is much more pleasant and beneficial than that of a close cabin with possibly unpleasant surroundings.

There can be no harm in using the cotton and the paper, also the lemon and gum if desired, but the open air and an active and interested mind are the best assets.

The movements of the vessel will have less effect on you if you view the waves in their approach from the bow of the ship rather than if you watch them from the stern, as they depart. The effect on the eyes seems to be less pronounced. Don't watch the waves in a mirror for you will get a double effect of their action in that manner.

CUSTOM LAWS OF THE UNITED STATES.

Each resident of the United States, coming from abroad, is allowed to bring in, in addition to what he took away with him, one hundred dollars' worth of goods.

This includes clothing, toilet articles, combs, brushes, articles of personal adornment, such as jewels, such personal effects as cameras, fishing tackle, golf sticks, guns, photographs, parasols, smoking articles, steamer rugs, shawls, toys, trunks, valises, etc. But these articles must be for the personal use of the individual bringing them in.

"DON'TS" FOR TRAVELERS.

- Don't fail, in forming your plans of travel, to arrange for the full moon at the most interesting portion of your trip. It will add 100 per cent to the pleasure of your journey. If the local Pacific coast trip is taken, it is advisable that you choose the starboard, or land, side of the ship for your cabin and the moon one-quarter to full for your leaving Panama, thereby getting three weeks of night views of the coast as well as your day views. The mountains lose none of the romance of their beauty when seen under the light of the full moon.
- Don't drink strange water.
- Don't go into the jungle alone; secure the services of a trustworthy guide.
- Don't fail to carry an identification card upon your baggage, as well as upon yourself.
- Don't fail to make a correct declaration to the customs officer, wherever met.
- Don't forget to eat sparingly on shipboard; it is a great preventive of sea sickness.
- Don't forget to have a small stock of the most necessary medicine, also a small bottle of liquor for medicinal purposes in your hand-baggage. Be careful of your diet. Do not expose yourself unnecessarily to the direct rays of the sun. Remember the country is right if you approach it right; keep your mind clear, your good nature to the front, and the troubles of the country will probably pass you by.
- Don't fail to remember a long voyage with no likelihood of getting your linen laundered will call for quite a supply of collars; one of the ship's stewards will probably look after your rough laundry.
- Don't go into the sun without protection of an umbrella. Remember the days are hot, the nights cool; dress accordingly. A duck suit for the men will be found a great satisfaction.
- Don't forget that the post office facilities of the Central American Republics are unreliable. Do not feel badly if many post cards sent in their care never reach their destination. Send a few extras to make sure that some you value really do arrive.
- Don't fail to remember that rubbing the gum side of your postage stamps over your hair will, in a measure, prevent them from sticking together—a bane to the traveler in a tropical country.

"DON'TS" FOR TRAVELERS—(Cont'd).

- Don't have more native money or stamps in your possession than you can use locally. To carry foreign money away with you is some loss.
- Don't use the services of a native before making a specific contract with him, thereby avoiding the possibility of an international complication.
- Don't fail to have kodak pictures developed on the Isthmus, if possible. Promptness in this respect may save them. They are soon ruined by the prevailing humidity. If compelled to carry a roll of films, wrap them in the clothing in your grip. Do not leave them in the metal can they come in, as they will collect moisture.
- Don't forget that an expense of ten or twenty cents in each country rightly applied will allow you to assemble a very neat collection of native postage stamps.
- Don't forget your fountain pen and a small bottle of extra ink.
- Don't forget to take a good compass and a field glass.
- Don't forget fish hooks and lines, if indulgence in the piscatorial art will assist you in pleasantly passing time during an enforced idleness in port.
- Don't forget to deposit your valuables with the ship's purser, as soon as possible after going aboard ship, and draw your table number.
- Don't fail to get a steamer chair from your deck steward. The cost is a trifle compared with the comfort.
- Don't neglect to obtain a copy of this Text Book on Panama and the Pacific Coast. It will assist you in your plans, keep you from making unnecessary or dangerous ones and do away with the necessity of your asking questions of strangers. It will enable you to cover much added territory in a limited period and will conserve your time and add to your comfort in many ways.

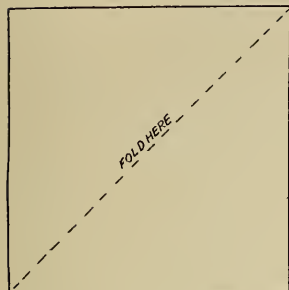
Fresh Paint.

- Don't forget that there is always painting being done on board ship. While the officers and crew will try to safeguard the passenger's clothing, a little watchfulness on the part of the latter will assist in avoiding damages.

Sanitary Drinking Cups.

- Don't fail to carry your own drinking cup. It is necessary on the Canal Zone and should be made so in all other places. If you should neglect to provide one, here is a design for a sanitary drinking cup that you can make out of any clean piece of paper in a few seconds:

SANITARY DRINKING CUP.



THE PAPER—FIG. 1.



FIG. 2

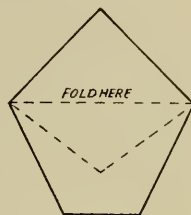
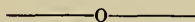


FIG. 3.



THE CUP—FIG. 4.



QUICK SPANISH LEXICON.

There is little probability that the traveler along the routes encompassed within the covers of this book will need an extended knowledge of the Spanish language. Unless he desires to make excursions away from the beaten paths of travel, he will at all times be surrounded by those who speak his own language.

Yet at times a small vocabulary of Spanish may be of advantage, and to this end the following is appended. The object of the writer is to accomplish as much in as little space as possible, and it is suggested that the traveler, in his transactions, point to the English word of the object spoken of, allowing the opposite Spanish meaning to be followed by the respondent.

ENGLISH.

good morning
good afternoon
good evening
come here
thank you
how much money?
what is it?
who is it?
do you speak English?
do you speak Spanish?
what is your name?
where are you going?
where do you live?
what time is it?

SPANISH.

buenos dias
buenos tardes
buenos noches
ven aca
gracias
cuantos dinero
que es eso
quien es
habla V. Ingles
habla V. Espanol
como se llama
adonde va V.
donde vive V.
que hora es

QUICK SPANISH LEXICON—(Cont'd).

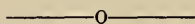
ENGLISH.	SPANISH.	ENGLISH.	SPANISH.
God	Dios	lord	don
physician	medico	lady	dona
well	bien	sir	senor
sick	mal	madam	senora
good bye	a' Dios	all	todo
adieu	adios	also	tambien
hungry	hambre	in	en
thirsty	sed	on	sobre
what for	porque	into	en
I do not know	no se	the	el
cheap	barato	of	de
dear	caro	this	este
far	lejos	my	mi
near	cerca	old	viejo
more	mas	pretty	bonita
less	menos	because	porque
big	grande	behind	dotras
small	menudo	before	enfrente
good	bueno	below	debajo
bad	malo	beneath	abajo
high	alto	deep	profundo
low	abajo	up	arriba
here	aqui	and	y
there	alli	within	dentro
what	que	without	fuera
tired	cansado	where	donde
with me	conmigo	for	por
wealthy	rico	very	muy
poor	pobre	enter	entre
hurry	pronto	star	estrella
middle	medio	sun	sol
white	blanco	moon	luna
black	negro	sky	cielo
red	rojo	earth	tierra
blue	azul	sea	mar
brown	castano	ocean	oceano
green	verde	island	isla
one	uno	river	rio
two	dos	cloud	nube
three	tres	rain	lluvia
four	cuatro	snow	nieve
five	cinco	warm	coloroso
six	seis	cold	frio
seven	siete	north	norte
eight	ocho	south	sur

QUICK SPANISH LEXICON—(Cont'd).

ENGLISH.	SPANISH.	ENGLISH.	SPANISH.
nine	nueve	east	oriente
ten	diez	west	occidente
fifteen	quince	grass	yerba
twenty	veinte	money	dinero
twenty-five	veinte y' cinco	cent	centavo
fifty	cincuenta	dollar	paso
one hundred	ciento	gold	oro
minute	minuto	silver	plata
hour	hora	iron	hierro
day	dia	city	cuidad
night	noche	house	cas
week	semana	street	calle
month	mes	hotel	posada
year	ano	room	camara
today	hoy dia	door	puerta
morning	dias	chair	silla
afternoon	tarde	table	mesa
evening	noches	plate	plato
yesterday	ayer	glass	vaso
tomorrow	manana	cup	taza
railroad	ferrocarril	knife	cuchillo
road	camino	fork	tenedor
mile	mi	spoon	cuchara
cab	coche	breakfast	almuerzo
wagon	carro	dinner	comida
horse	caballo	supper	cena
cow	vaca	lunch	merienda
dog	perro	fruit	fruta
cat	gato	fire	fuego
pepper	pimienta	clock	reloj
kitchen	cocina	match	mecha
egg	huevo	key	llave
soap	jabon	bed	cama
grape	uva	soup	sopa
wine	vino	bread	pan
fish	pez	meat	carne
chicken	polluelo	butter	mantequilla
cheese	queso	apple	manzana
milk	leche	coffee	cafe
cherry	cereza	tea	te
man	hombre	water	agua
woman	mujer	salt	sal
boy	muchacho	envelope	sobre para carta
girl	muchacha	stamp	sello
father	padre	letter	carta

QUICK SPANISH LEXICON—(Cont'd).

ENGLISH.	SPANISH.	ENGLISH.	SPANISH.
mother	madre	book	libro
brother	hermano	pen knife	cortapluma
sister	hermana	flag	bandera
office	oficio	hand	mano
bird	pajaro	foot	pes
kiss	beso	hat	sombrero
home	bohio	coat	cassaca
miss	senorita	shirt	camisa
he	el	shoe	zapato
she	la	gloves	guantes
you	tu	umbrella	paraguas
me	mi	bath	bano
friend	amigo	flower	flor
servant	criado	pencil	lapiz
porter	portero	song	canto
yes	si	cloth	pano
no	no	beard	barda
head	cabeza	mustache	bigote
mouth	boca	sleep	dormido
eye	ojo	pen	pluma
ear	oreja	ink	tinta
comb	peine	paper	papel



A TIP TO SOUVENIR COLLECTORS.

Almost all stores are controlled by Chinese, but whether controlled by Chinese or natives, a good bargainer will find that two prices exist—the “entrance” and the “exit” price. The shrewd buyer can usually obtain what he desires at what he will consider a reasonable price.

NAUTICAL DAY.

The nautical day on shipboard begins at twelve o'clock noon. A blast is blown on the big whistle, and the mileage of the last twenty-four hours is posted in the main cabin, together with the noon latitude and longitude of the ship.

COLOR OF SEA WATER.

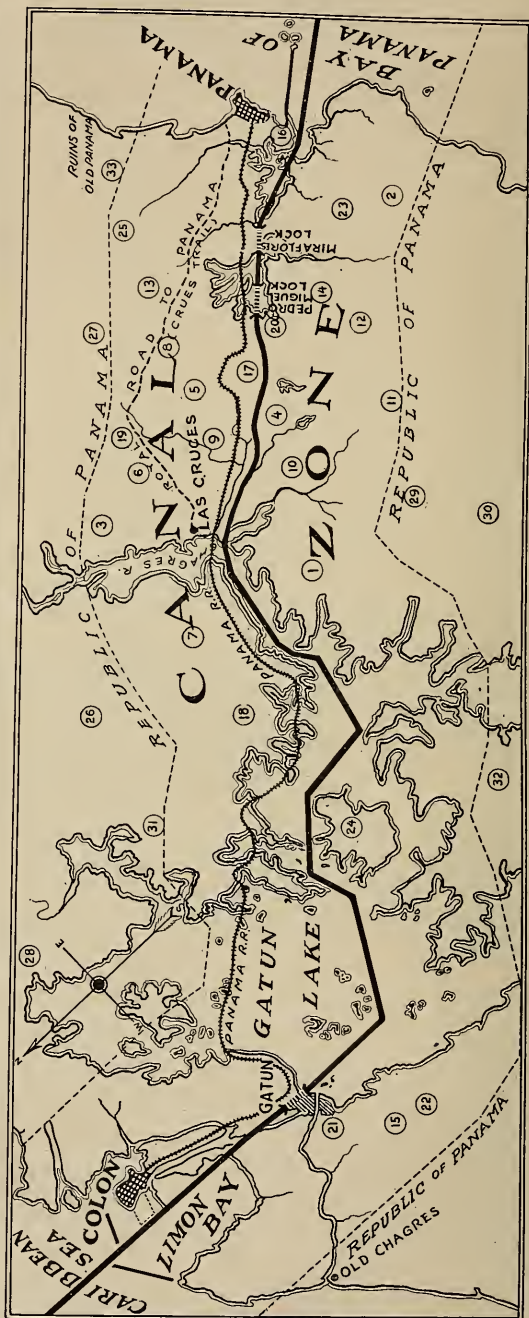
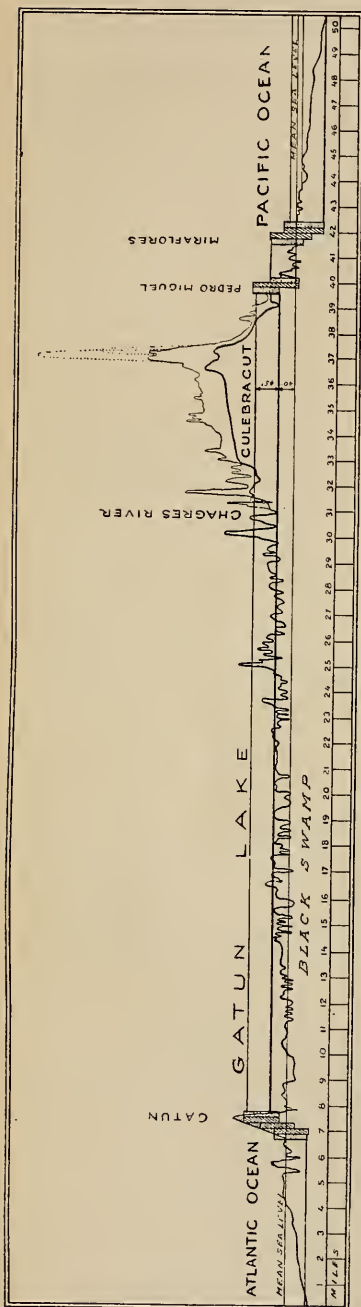
Sea water takes its color from the local component parts of the water. Microscopic sea weeds give the color to the Red Sea, the floods of the great rivers color the Yellow Sea of China.

The waters of the ocean are blue, the various shades being in ratio to the proportion of their saltiness.

PART I.

THE CANAL.

- (a) The Canal and Its Construction.
- (b) The Panama Railroad.
- (c) Sanitation.
- (d) Historical Summary.



Parallel Maps of the Canal Zone—the Upper Map Showing Relative Elevations. The Lower Map Shows the Canal Zone in Detail and the Mountains, Which Are Numbered, May Be Identified by Reference to the Table of Elevations on Page 67.

(A)

The Canal and Its Construction.

—o—

PANAMA CANAL.

Facts.

Total cost of Canal.....	\$375,000,000
Fortifications and other expenses, including annual payment to Panama.....	25,000,000

Total.....\$400,000,000

Total excavation by the French...	78,000,000 cubic yards
Of use to Canal.....	30,000,000 cubic yards, or 1/7
Total excavation by Americans...	195,000,000 cubic yards, or 6/7

Grand total excavation.....	225,000,000 cubic yards
Dynamite used.....	55,000,000 lbs., or 27,500 tons

Length of Canal.

Atlantic sea level to Gatun Locks.....	8 miles
Lake and Cut, surface of water 85 feet above sea level...	32 miles
Miraflores Lake, surface of water 55 feet above sea level.	2 miles
Miraflores Lake to Pacific sea level.....	8 miles

Total length.....50 miles

Width of Canal (at Bottom).

Atlantic entrance.....	500 feet
Gatun Lake.....	1,000 feet
Chagres River.....	500 feet
Culebra Cut.....	300 feet
Miraflores Lake.....	500 feet
Pacific entrance.....	500 feet

Deep water to deep water, 50 miles.

Shore line to shore line, 40 miles.

Dredged shipway from shore line to deep water, both entrances to Canal, 10 miles.

Time in transit, 10 to 12 hours.

Angles in Canal, 22.

Total curvature, 600° 51'.

Total curvature to right, 281° 10'.

Total curvature to left, 319° 41'.

Sharpest curve, Tabernilla, 67° 10'.

Important Dates.

United States acquired Canal Zone, February 26th, 1904.

United States acquired property rights of French Canal and began work May 4th, 1904. The purchase price of forty million dollars was paid in one single check through the banking house of J. P. Morgan & Co. of New York City, on June 16th, 1904.

Official date of completion, January 1st, 1915.

THE PANAMA CANAL.

The Panama Canal has been built over the same general route that was planned and in part executed by the French Company.

It leaves the Atlantic at Colon and approaches the Gatun Hills, a distance of eight miles, through swamp and low ground.

After the level of the Canal is raised eighty-five feet by the three steps of the Gatun Locks, the Canal enters and crosses what was formerly the Black Swamp, but which is now Gatun Lake, for a distance of twenty-three miles to where the Chagres River enters from the northeast. Here the Canal enters the famed Culebra Cut, going up the valley of the Obispo River to the summit of the range, passing between Gold Hill on the left and Contractors' Hill on the right, and thence by way of the valley of the Rio Grande to Pedro Miguel Lock. After a drop of thirty feet in this lock, the Canal passes for two miles through Miraflores Lake to Miraflores Locks. The two steps of these locks lower the Canal fifty-five feet, thus bringing it to the Pacific water level; eight miles along the valley and through the swamps to Balboa brings the Canal to deep water on the Pacific Ocean.

The trend of the Canal is, in the main, northwest and southeast, the Pacific entrance being about twenty-two miles east of the Atlantic entrance.

The distance from salt water to salt water at this point on the Isthmus of Panama is about thirty-five miles, but the curves and windings of the Canal make its finished length approximately fifty miles.

Three great engineering problems confronted the builders in the construction of the Canal; the first and most difficult was the control of the waters of the Chagres River and its tributaries; the second in importance was the Black Swamp; while the third was the cut through the Continental Divide.

How successfully these problems were handled, the public at large can now judge.

The width of the bottom of the Canal from the Atlantic to the Gatun Locks and from Pedro Miguel Lock to the Pacific is 500 feet. The width through Gatun Lake is 1,000 feet, and the width through Culebra Cut is 300 feet. The depth of water thro

the complete Canal is 45 feet. The surface elevation of the water in Gatun Lake and Culebra Cut is 85 feet above mean sea level, and the floor of the Canal in this section is 45 feet less (the depth of the Canal), or 40 feet above mean sea level. The mean sea level of the Atlantic and Pacific Oceans is the same, although the daily tide of the Pacific Ocean ranges from 18 to 22 feet, while that of the Atlantic is only 2 feet and at times misses even that.

The original elevation of the lowest point through the Continental Divide on the Isthmus of Panama at Culebra Pass was 312 feet above mean sea level, or 272 feet above the bottom of the Cut. The slope of the sides of the rock cut was intended, in the original plans of the engineers, to be 3 feet in 2 feet, but the various slides have caused great variations from this plan.

Coaling stations, machine shops and supply stations are located at each end of the Canal.

The first two years of United States' possession were mainly devoted to organization and sanitation, ways and means for excavation and construction, and the assembling of the plant.

American Purchase Valuation.

The government of the United States acquired the rights of the Panama Canal from the French Company in 1904 for \$40,000,000. This price was based on the following official valuation:

French excavation useful to Canal.....	\$25,389,240
Panama Railroad stock.....	9,644,320
Plant and material.....	2,112,063
Buildings used.....	2,054,203
Surveys, maps, plans, records, etc.....	2,000,000
Land.....	1,000,000
Ship Channel, Panama Bay.....	500,000
Clearings, roads, etc.....	100,000

Total valuation.....	\$42,799,826
The purchase price of the Canal was.....	\$40,000,000
Subsequently, in 1904, the United States bought the Canal Zone from the new Republic of Panama for.....	10,000,000

Making a total purchase price of.....\$50,000,000
(See page 55 for details of purchase.)

COMPARISON WITH SUEZ CANAL.

Readers who may be interested in the comparison of the work involved in the construction of the two great inter-oceanic canals (Panama and Suez) will find on page 56 a synopsis of the construction of the Suez Canal.



Gatun, Showing the Distinctive Style of Architecture Introduced into the Tropics as a Result of American Occupancy.

ORGANIZATION OF PANAMA CANAL FORCE.

The Isthmian Canal Commission was composed of seven members: five officers from the engineering corps and one officer from the medical corps of the United States Army, and one civilian in charge of the civil administration of the Zone.

In the execution of this work the following departments were organized:

Construction and Engineering.	
Subsistence.	Sanitation.
Quartermasters.	Disbursements.
Civil Administration.	Examination of Accounts.
Canal Zone Judiciary.	Purchasing Department.
Law.	Panama Railroad Company.

The Department of Construction and Engineering was in three divisions:

Central Division, from Gatun Dam through Gatun Lake and Culebra Cut to Pedro Miguel Lock.

Atlantic Division, from Atlantic to and including Gatun Dam and Locks.

Pacific Division, from and including Pedro Miguel Lock to Pacific Ocean.

The construction of the Panama Railroad and the municipal improvements of Colon and Panama City were in charge of the Department of Construction and Engineering.

The Mechanical Division had charge of all mechanical questions and supervised expenditures, preparation of estimates and allotments of work.

The Subsistence Department had charge of the operation of hotels, kitchens and messes.

The Quartermaster's Department recruited labor, furnished quarters, distributed fuel, commissary supplies and water, received and handled all supplies, cut grass, handled garbage, and audited all property returns.

The Department of Civil Administration had charge of ports, customs and revenues, police, prisons, fire protection, public works, courts, and Canal Zone funds.

The Department of Sanitation had charge of the health of the Canal force. It cleared the land in the path of the actual construction work—cutting down brush, draining swamps and burning the stubble and refuse by pouring oil on the land and then firing it. It conducts hospitals at Ancon, Colon and Culebra, as well as a leper asylum at Palo Seco, and a sanitarium on Taboga Island.

ORGANIZATION OF FORCE—(Cont'd).

Working Force of Construction.

Following is the distribution of the working force during 1912:

Total force employed.....	37,438
Railroad construction and operation.....	4,237
Canal construction.....	33,201

Official Report of 1912.

The percentage of distribution of the working force among the various departments follows:

Department of service (construction and engineering).....	26,699	or	80 per cent
Department of subsistence.....	706	or	2 per cent
Quartermaster's department.....	3,677	or	11 per cent
Department of sanitation.....	1,371	or	4 per cent
Lesser departments.....			3 per cent
	33,201	or	100 per cent

Percentage of Distribution.

This is an interesting and a remarkable table and it is worth close consideration. It demonstrates the result of system and close organization, an elimination of unnecessary friction in the Canal machine and probably greater working results with less loss of force than has ever been attained by any other great operating body.

Here was a great army, set down in a strange land, a long distance from its own shores, surrounded by obstacles of unusual magnitude and working under conditions never before experienced by this force—yet of these thousands of men, every eighty out of each hundred were executing; that is to say, doing their part of the digging, and obtaining results. Thirteen men out of each hundred provided for their necessities, comforts and pleasures, and four of each hundred took care—and the best of care—of the health of the hundred. Here are results of organization of which the country may well be proud.

THE UNITED STATES ARMY-OF-CONSTRUCTION.

The idea the average business man entertains of the United States Army—if he stops his business long enough to entertain an idea on that subject—is a mental picture of “the man behind the gun”; it never occurs to him that to make that man efficient there are, of necessity, other departments. That, in order to

THE U. S. ARMY-OF-CONSTRUCTION—(Cont'd).

fight, he must be healthy, as comfortable as possible, and as happy and satisfied as he can be made; that he must be fed. The same is true of an army that is engaged in a warfare against nature. "It," as is said of the other army, "advances on its stomach."

In this "engagement" on the Isthmus of Panama, the man behind the gun is eliminated. That less-known department of the army—the engineering department—is in charge, with the assistance of the other departments of sanitation, subsistence, and the quartermaster's department—departments, by the way, whose importance is not usually realized.

The health of the body politic is of the first importance. In the old days, men advanced as they were able, dropping by the way as sickness or camp troubles overcame them. Under modern conditions, it has become a disgrace not to be in good physical fitness—a disgrace not only to the man who is sick, but to the department that allowed him to become so. Consequently, in a location where sickness and death were the rule, the opposite has become a fact, and the Canal Zone has become more healthy than the temperate zone. The men are kept healthy, well fed, and satisfied, and are then expected to work. And they do work.

The engineers of the army planned and executed on a larger scale, not only in the one great undertaking of building the Canal, but in each individual department, than was ever known before. Greater engineering problems were solved, larger quantities of work were done at less expense of time, men and money than ever before in the world's history; and not one single failure in the many heavy problems can be charged in the final result.

Service Medals.

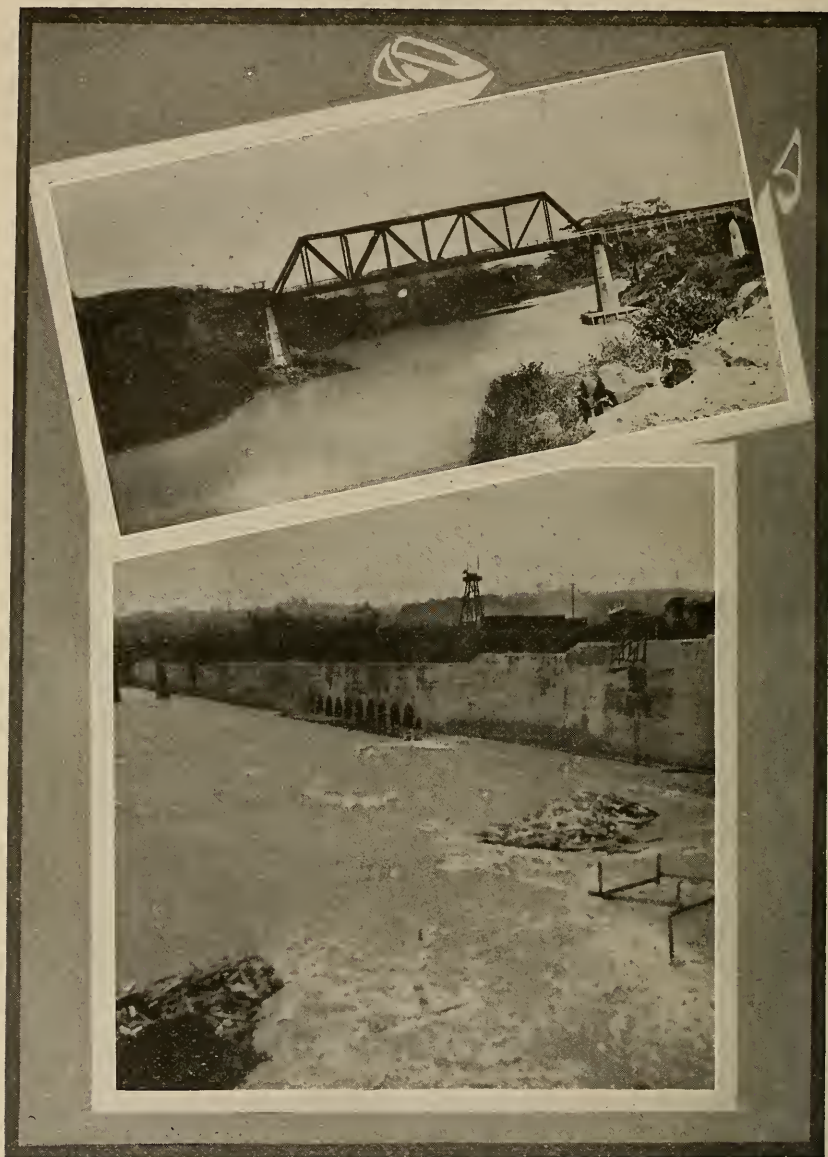
Service medals are awarded by the United States Government to its citizens who complete two years of service on the Canal or railroad, and a bar is added for each additional two years of service.

Society of the Chagres.

The Society of the Chagres is composed of white employes of the Canal or railroad of good character who have earned the Roosevelt Canal Medal and two bars, previous to the official opening of the Canal.

The Inca Society.

The Inca Society is composed of those whose term of service with the Canal Commission began during 1904.



- (a) Bridge of the Panama Railroad over the Chagres River at Gamboa.
- (b) Gatun Spillway. The Water Used to Generate Power for Operating Locks Will Pass Through the Openings Shown in Picture.

COLON BREAKWATER.

Extends from Toro Point:	10 feet above sea level.
11,700 feet long.	Cost \$5,000,000.
15 feet wide at top.	3,000,000 cubic yards.

THE CHAGRES RIVER.

The Chagres River enters the Canal Zone from the north side at about right angles to the trend of the Canal and nearly thirty miles from the Atlantic entrance to the Canal.

It formerly wound its devious way through the Black Swamp at its own sweet will, crossing the line of the Canal twenty-three times in twenty-two miles. It is variable in all its characteristics, changing in a day from a sleepy river, not fifty feet wide, to a torrent that could sweep away any obstruction set in its course. It drains a territory of 1,300 square miles, and its swift current and great volume of water, during the rainy season, made it the greatest of the big problems to be overcome in the completion of the Canal.

The engineers early decided that the best method of disposing of the waters of this river and its various tributaries was to build a dam across the Atlantic side of the Black Swamp. The waters thus impounded became Gatun Lake.

The surface of the lake so formed continues unobstructed from the dam at Gatun over the erstwhile swamp, along the Chagres River, to and through the cut through the Continental Divide to the locks on the Pacific slope.

Thus have the forces of the Chagres River been harnessed by the ingenuity of man and made to serve the interests of the commercial world.

With this solution of the water supply achieved, the disposition of the Chagres River ceased to perplex the engineers. The only point in question was whether the unruly river, thusly utilized, would, with its tributaries, furnish enough water to form the lake, fill the cut, and work the locks, making due allowance for evaporation, seepage and other natural losses of water. Records of the flow of the river satisfied the engineers in charge that this will be the case.

THE BLACK SWAMP.

The Black Swamp is no more, with its bottomless depths, its tenacious substance, dismal fastnesses, and impenetrable vegetation. It is now covered by the waters of Gatun Lake, and where the great struggle went on between man and nature in establishing the old line of the Panama Railroad and the present line of the Canal, one may now sail with no thought of the hardships of the pioneers.

THE BLACK SWAMP—(Cont'd).

A little study of the lay of the land here makes it evident that the entire area covered by the Black Swamp was in distant ages a depression, possibly a lake, that gradually filled with sediment and decayed vegetation, until, by the time this section of the country was explored, it was little more than a muck swamp.

What, with its thick covering of jungle, humid atmosphere, its intense heat, its lack of bottom, combined with tropical diseases and the absence of acclimated labor, it seems little less than miraculous that a railroad was ever successfully located through this swamp. It would appear to be rather a bridge floating on the mud and slime than an ordinary roadbed.

Workmen, when repairing the track, have found three lengths of railroad iron, ninety feet, swinging in the dark mud and yet not touching bottom.

But this section of the Panama Railroad has gone to its rest in a watery grave, and now the passenger floats above it in a modern ocean-going steamer, or passes around it to the east on the re-located line of the railroad. The Black Swamp with all its grewsome history has become a memory.

GATUN LAKE.

Gatun Lake extends along the line of the Canal from Gatun Dam for a distance of some fifteen miles and for possibly the same distance at right angles to the Canal. Its shores are irregular, and it contains various islands and has an area of about 160 square miles. It covers what was formerly the Black Swamp.

It is formed by the waters from the Chagres River and its various tributaries, which Gatun Dam holds in check. Through what was once called the Black Swamp, whose surface is now covered by this lake, a channel 1,000 feet wide has been dredged for the Canal and the course of ships is laid by lights and buoys.

Ample warning was given settlers in the lake district before the lake was allowed to form, and residents were notified to move. The Canal buildings in this area were put on sale and the standing timber sold. The stand of timber was not heavy as the land had been occupied for three hundred and fifty years and had been cut over and burned over many times during this period. The valuable woods in this territory included cocobolo, guayacan, Panama mahogany and Spanish cedar. Some of these woods are too heavy to float on water.

THE GATUN DAM.

Facts.

One-half mile wide at bottom.

Four hundred feet wide at water-line.

One hundred feet wide at top.

Summit one hundred and fifteen feet above mean sea level.

Thirty feet higher than surface of lake.

One and one-half miles long.

Twenty million cubic yards of material used in construction.

Slope of sides, one foot in eight to twelve feet.

* * * * *

Gatun Dam holds in check the waters of Gatun Lake. This dam is 115 feet high on its center line, 2,200 feet wide at its base line, 100 feet wide at its top and one and a half miles long.

The magnitude of the dam may be more generally appreciated if you will realize that the rise in the slope of the side of the dam is from one foot in eight feet to one foot in eleven feet.

It crosses the valley from where the Chagres River broke its way from the Black Swamp in its course to the ocean, and the dam is braced against the opposite hills as well as against a small hill it crosses near the center of this valley.

The dam was formed by first dumping the rocks from Culebra Cut in long side-lines, and then by pumping water from the swamps and rivers into the basin so formed, and letting the sediment settle and form the core of the dam. The sediment so deposited is impervious to water, consequently the dam is absolutely water-tight.

GATUN LOCKS.

Facts.

Twin series, three locks; total, six locks.

Each lock 1,000 feet long.

Each lock 85 feet high.

Each lock 110 feet wide.

Each entrance 500 feet long.

Total length of locks 4,000 feet.

Two million cubic yards of concrete used.

Locks rest on rock foundation; part of approaches are on piling.

Cost—Excavation. \$ 6,000,000

Concrete. 14,000,000

Gates. 5,000,000

Total. \$25,000,000

* * * * *

Gatun Locks are in twin series of three locks, making a total of six locks, and form three steps of a stairs ascending, or descending. Each lock is 1,000 feet long, and the total length of the three, with the two entrances, is 4,000 feet. They are 85 feet high and 110 feet wide.

GATUN LOCKS—(Cont'd).

A ship in passing from the lower Canal to Gatun Lake will enter the lower lock on the water level of the Canal. The lower gates will be closed and water introduced into the chamber occupied by the ship from the openings in the floor of the lock until the water level of the lock is the same as the second or middle lock. Then the ship is advanced to the second or middle lock, and the gates to the lower lock are closed. Water is introduced into this lock chamber until the water level is the same as the upper or third lock, when the ship is moved into the third lock.

After closing the lower doors of the third lock, the water is introduced from the bottom of the lock until the water in this lock is on a level with the lake, when the upper and last gates are opened and the ship is at liberty to proceed on her way across the lake and through the cut to the Pacific Locks.

The journey from the Pacific to the Atlantic is accomplished by reversing these proceedings.

Every safeguard has been provided for the ship in the way of fenders and chains. All local power is electrical and under the control of a power center that simplifies the work of raising or lowering the ship from one level to the next.

Four motors stationed on tracks on the walls of the locks, two fore and two aft, regulate the movement of the ship while passing through the locks. On the lake, the ship proceeds by its own power.

Intermediate gates are in each lock, if the necessity should arise to use less water, or if for any reason it would seem best to shorten the locks.

GATUN SPILLWAY.

Near the center of the dam is located the Spillway, a concrete flume with gates that may be lowered or raised as the head of water in the lake makes necessary.

Two hundred and twenty-five thousand cubic yards of concrete were used in its construction. It is one-fourth mile long and three hundred feet wide and has fourteen openings and fourteen gates. Weight of gates is forty-three tons each. Electricity is here generated for the operation of Gatun Locks.

Floating Islands of Gatun Lake.

With the forming of Gatun Lake, floating islands appeared upon its surface. These islands are masses of decayed vegetation and fallen trees held together by the roots of a dense overgrowth of swamp plants. They seem to have been formed in the Black Swamp and to have been loosened by the gradual rise of the lake waters. They vary in size, some being 200 or 300 feet long, and having sufficient solidity to support a man.

CULEBRA CUT.

Facts.

Culebra ("Snake").

Cut through solid rock through the backbone of Continental Divide from Chagres River up Obispo River to and through pass between Contractor's Hill and Gold Hill, and down Rio Grande to Pedro Miguel Lock.

Increase in amount of excavation, 50 per cent above original estimate.

Original estimate of time required for completing the Cut, ten years; actual time required, seven years.

Original estimate cost per cubic yard in Cut, 98 cents; actual cost ranged around 58 cents.

Nine miles long.

Three hundred feet wide at bottom; originally planned to be 200 feet, but later increased to 300 feet by President Roosevelt's official order.

Original slope on sides, three feet to two feet, later increased by slides. [See page 38.]

Depth of excavation ranges from 85 feet at Chagres River to 375 feet at Contractor's Hill and 500 feet at Gold Hill.

Height of Pass, 272 feet above bottom of Canal.

Bottom of Cut, 40 feet above sea level.

Depth of water, 45 feet.

Surface of water, 85 feet above mean sea level of oceans.

On each side of Cut large diversion channels were cut to provide for surface water.

Rock excavated was used at Gatun Dam and for Pacific entrance Breakwater and to fill in low ground.

Geology proves this rock to be sedimentary.

* * * * *

This great cut through the hills, between the Atlantic and Pacific, extends from the Chagres River in a generally southeasterly direction for a distance of nine miles. It follows the original valley of the Obispo River to the summit of the range at Contractor and Gold Hills, thence down the valley of the Rio Grande to Pedro Miguel Lock.

The bottom of the Cut is 300 feet wide and the sides vary in height from about 75 feet at the Chagres to 375 feet at Gold Hill and 500 feet at Contractor's Hill, with the variable side slope made necessary by the troublesome slides.

The bottom of the Cut is 40 feet above mean tide-level of the ocean, and the top of the water in the Cut is on the same level as that of the lake—45 feet higher—or a total height of 85 feet above sea level.

Because of the length and depth of the Cut, combined with its small relative width, and the continued slides of the banks,

CULEBRA CUT—(Cont'd).

this section of the Canal has overshadowed all of the other work. While the engineering difficulties of providing for the waters of the Chagres River and disposing of the Black Swamp were greater, the mechanical work in Culebra Cut has been the most difficult. The River, the Dam, the Lake, and all other work of the Canal could have been completed before the final date, except that there was no occasion to finish them before Culebra Cut could be finished.

The rock from the Cut has been used for the shell of the big Dam at Gatun, for the Naos Breakwater at the Pacific entrance to the Canal, and for filling swamps and low ground.

History contains the record of no other work of this character that approximates its magnitude in any respect. And yet so well has the construction force carried out its work that while the original estimate of the quantity of earth to be removed has been increased more than one-third, the cost has been held within the original estimate and the final work has been finished in less than the original estimate of time—making new records in all departments of its construction that will probably stand unapproached for years to come. Acres of dirt from the slides have come into the Canal, the bottom of the Canal has been forced upward, unknown difficulties of great magnitude have appeared along the line of construction; but this wonderful work steadily progressed regardless of each new impediment, with at no time an acknowledgment of discouragement on the part of the working force.

Work was planned so that the center of the Cut was always kept higher in the excavation than the two ends, thereby causing the natural drainage of water to take care of itself by flowing out of the Cut at Pedro Miguel by its own gravity, and to the temporary dam at Gamboa. This dam was placed across the mouth of the Cut to keep the waters of the Chagres River from flowing into it before it was completed. Water accumulating in the Cut at the dam from the natural drainage to that end of the Cut was pumped through a pipeline, over the dam and into the Chagres River. The highest place of the Cut being held at one point in the Cut during its digging also allowed all loaded trains to run down grade, whether bound toward the Pacific or toward Gatun Dam, the empty cars only having to be hauled up the grade.

SLIDES IN CULEBRA CUT.

The slides in Culebra Cut were unusual and so many and of such immense proportions that they brought a new and important feature into the digging of the Canal. They increased

SLIDES IN CULEBRA CUT—(Cont'd).

the estimated cubic yardage of the Cut. They varied from small slides to slides almost fifty acres in extent.

Rock that was ordinary in its formation became soft under exposure and crumbled and slid or rose up from the bottom of the Canal, and even after years of study and work the construction force admits the cause to be unknown. The effect has been so far-reaching that even the end is not positively assured, at this writing.

It has been thought by some that the mountain chain arched at this point over some great subterranean swamp, or something of like character, and that, when the backbone of the chain was cut and the keystone removed, as it were, the two severed ends, being unsupported by each other, slowly subsided by their own weight, thus forcing up the center of the Canal. This has been aptly illustrated by using the simile of a pan of dough. The two hands forced down into the dough would cause it to rise in the middle.

Be that as it may, when all theories failed, it is a remarkable fact that the construction force never wavered. With renewed eagerness it attacked each new problem, always with the same vim, vitriol, and vitality—making assurance doubly sure. The fine result at the present day stands as a monument to that great precept of the army—"Never question, but act."

Methods of Prevention.

Believing the rocky walls of Culebra Cut could be protected from the action of the atmosphere and made more permanent if coated with concrete, a pneumatic concrete gun was used for spraying liquid concrete. This gun did not prove to be a success along the Cut, but was a success when used on hand-laid stone walls located along the line of the re-located railroad. The gun forced the concrete several feet into the stone wall and made the binding of the rock much more complete.

A more successful plan for preventing slides in the Cut was sought and found in removing the surface from possible troublesome locations and then planting grass, the subsequent vegetation thus forming a shield against rains.

Geology.

Marl Shales. (Marl; Carbonate of lime, clay and silicious sand.) Clearly stratified, showing it was originally deposited in water.

The shallow deposits in the water indicate a swampy condition which was probably at one time an arm of the sea, as fossils of marine animals were found. The time is supposed to be the early Tertiary or Oligocene period (Report of Commission Geologist).



(a) Suspension Bridge Across Culebra Cut at Empire.
(b) Drills at Work in Culebra Cut.

CULEBRA CUT SLIDES.

The following table will show somewhat the trouble caused the working force of the Canal from slides into Culebra Cut. This is not a complete table, but is given in the annual report of the Isthmian Canal Commission for 1911. This record begins at the Chagres River, and continues through to the Pacific end of the Cut:

Location	Area Acres
East side, opposite Bas Obispo.....	1.6
East side, opposite Haut Obispo.....	.6
West side, Buena Vista.....	.6
East side, Las Cascadas.....	8.3
East side, Whitehouse.	4.6
East side, Whitehouse.	2.9
East side, Upper Lapita.....	1.7
East side, Lower Lapita.....	.3
West side, Cunette.	.9
West side, Culebra.....	46.6
West side, North Contractor's Hill.....	2.6
East side, Culebra.	31.6
East side, Cucaracha.	47.1
West side, Contractor's Hill.....	2.0
East side, Paraiso.	5.7
Total.	157.1

HEATED AREAS IN CULEBRA CUT.

An interesting scientific problem that developed in the quarrying of the Cut and that caused much anxiety and some uncertainty to the engineering force was the abnormal heat generated in the rock bottom of the Cut as the work progressed. At one time this was so important that a report of the conditions was made to the engineer in charge by the Commission Geologist. A small area near the Station of Culebra developed quite a cloud of white steam, and the openings from the blasting developed enough heat to char wood.

After a thorough examination the Geologist reported the material through which the Cut is made to be such that local heat is developed upon exposure of the rock to the air.

"The oxidation of pyrites of iron developed initial heat, assisted by the hydro-carbons of the lignitic shale—accelerated to an extent by the action of the free sulphuric acid on the calcium carbonate for the formation of gypsum. As the temperature rises, all chemical activity is vastly stimulated. After the most readily oxidizable substances are consumed, the heat gradually dies down to a normal temperature."

PEDRO MIGUEL LOCK.

Pedro Miguel Lock is a pair of chambers of one elevation alone, having a single drop of thirty feet. The passage of a vessel through this lock is the same in action as through the individual locks at Gatun.

Nine hundred thousand cubic yards of concrete were used in its construction.

MIRAFLORES LAKE.

The distance across Miraflores Lake to Miraflores Locks is two miles, and the width of the lake is about the same. This lake was formerly a marsh, and the water is held in place by a dam at Miraflores.

All of the former conditions of the Black Swamp were duplicated here, although to a less extent, and were overcome in the same manner, *i. e.*, by building a dam and forming a lake.

MIRAFLORES DAM.

Two thousand seven hundred feet long.

Top of dam fifteen feet above water-line of lake.

MIRAFLORES LOCKS.

Twin series, two locks; total, four locks.

Each lock 1,000 feet long, 110 feet wide.

Combined lift fifty-four and two-thirds feet.

One million five hundred thousand cubic yards of concrete used in construction.

MIRAFLORES SPILLWAY.

Five hundred feet long.

Seventy-five thousand cubic yards of concrete used in construction.

Eight openings. Eight gates.

Weight of gates, forty-three tons each.

NAOS BREAKWATER.

The Naos Breakwater extends from the mainland at Balboa on the axis of the Canal to Naos Island, a distance of three miles. The ocean currents passing between this island and the mainland washed sand into the mouth of the Canal. The breakwater protects the Canal from this trouble, and also forms a broad road to the fortified islands.

It is seventeen thousand feet long and twenty to forty feet above mean sea level, while fifty to three thousand feet wide at the top. Eighteen million cubic yards of rock and earth brought from Culebra Cut were used in its construction.

BALBOA.

Balboa is the name of the town located at the Pacific entrance of the Canal, as Cristobal is, at the Atlantic entrance. Balboa is four miles from Panama City and can be reached by electric line or by either one of two good roads—one road passing to the right of Ancon Hill and the other between Ancon Hill and the ocean. Great wharves are located here, with all the facilities for expediting the handling of the cargoes of large ocean-going vessels.

THE CANAL'S LIGHTING SYSTEM.

Range lights are used for long tangents and side lights are placed about one mile apart to locate each side of the Canal.

Acetylene gas is used on lighted buoys and lake beacons. These lights are automatic in operation, being equipped with patent swinging valves and copper cylinder, the latter expanding when daylight falls on apparatus, thereby closing a valve and shutting off the flow of gas to the burner, leaving only a pilot light burning. When the light of day is gone, the cylinder contracts, permitting the valve to open and acetylene gas once more passes to burner.

There are no range lights in the Cut.

BUOYS.

Buoys are "day marks" as in opposition to lights and beacons, which are designated "night marks." Buoys are under the control of the lighthouse board. Similar buoys always mean the same thing, regardless of location. The channel is marked by black and red buoys. The black ones have odd numbers and are left on the port, or left hand side, by the ship, while the red buoys are designated by even numbers and are left on the starboard, or right hand side, by the ship. A buoy with red and black horizontal stripes shows an obstruction in the channel. A buoy showing white and black perpendicular stripes and lying in mid-channel indicates it must be passed close to avoid danger. At turning points in the channel the buoys are surrounded by cages, triangles, etc.

The whistling buoys or bell buoys are also fog signals. They are used to show outlying obstructions. The whistling buoy is operated by the air rushing through it. The air is admitted and compressed by the rising and falling motion of the buoy on the waves. The more violent the sea, the louder becomes the whistle. It can be heard ten or fifteen miles.

The bell buoy rests on a platform and supports a bell. Instead of the bell having a tongue and clapper, a small cannon ball is supported on the platform underneath the bell. This ball

rolls around on the platform with the motion of the sea, striking the bell as it rolls.

The buoy may be made of wood or iron. Iron buoys are hollow and have air-tight compartments. They are divided into three shapes,—the “nun” buoy, almost conical in shape; the “can” buoy, nearly cylindrical, and the “ice” buoy, which is long and narrow.

FRENCH SCRAP.

After the Canal authorities had repaired all the old French buildings and machinery that justified the expense, the remainder of that property found to be useless was sold as scrap.

On the books of the Canal Commission the totals of the scrap account are carried as follows:

Used on Canal.....	\$1,000,000
Sales.	208,000
Sold to highest bidder, final clean-up..	215,000

Total. \$1,423,000

Eleven bids for the remaining scrap on hand were received upon advertisement of its sale. These bids ranged from \$40,000 to \$215,000, the bid accepted.

CANAL TOLLS.

Canal tolls are based on the net registered tonnage of the ship. The ship may carry double—or more—than its registered tonnage and still pay no more than if it carried its registered tonnage. Example:

Ship “A” is registered at 1,000 tons, but, in fact, carries 2,000 tons. Its toll is on its regular tonnage (1,000 tons), the excess tonnage of 1,000 tons passing through the Canal free of tolls. The transportation company, as owner of the ship—and not the producer, nor yet the consumer, as might be inferred—benefits by this condition.

STEAMSHIP DIMENSIONS.

The dimensions of modern steamships have increased steadily in all measurements, and the end is not in sight. The following measurements will show the general tendency to increase their size:

Name.	Length.	Width.	Tonnage.
Gigantic.	1,000	..	
Imperator.	900	96	50,000
Aquatania.	900	95	50,000
Olympic.	882.6	92	45,324
Mauretania.	790	88	32,000
Lusitania.	790	88	32,000

(B)

THE PANAMA RAILROAD.

Facts.

Re-located line, cost \$9,000,000.

Length, 47.11 miles.

Has branch line to Gold Hill, about two miles long.

Tunnel at Miraflores, 736 feet long.

Four heavy embankments on line around Gatun Lake.

Hardwood ties.

Ninety-pound rails used in construction.

Highest altitude 270 feet, opposite Las Cascades.

Continental Divide, opposite Culebra, 240 feet elevation.

Maximum grade, one and one-quarter per cent.

Maximum curvature, radius of 819 feet.

Time in transit, Colon to Panama, two hours and twenty-five minutes.

One-half of the ties used on the old location of the railroad were in good enough state of preservation to be used on the re-location.

Rails on old location used for telegraph poles on re-location.

* * * * *

The Panama Railroad when completed in 1855 ran from Colon along the same general line that since has been followed by the Canal. What with the jungle, the swamps, the grades, and the unsanitary conditions, the building of the railroad was fraught with many disasters, physical and financial.

Four and one-half years were consumed in its building, and all the labor troubles that belong to all large building operations in the tropics were contended with. Its roadbed through the Black Swamp was simply placed on the mud, rebuilt when lost, until finally it became more of a suspension line than a solid roadbed. Under the ownership of the United States Government, it was rebuilt and double-tracked. It always has been worked to its full capacity, both in freight and passenger service, and has been the best paying railroad per mile in service that has ever been constructed—paying in certain years as high as twenty-five per cent on the investment.

The forming of Gatun Lake has covered that part of the line lying over the big swamp, and its re-location skirts the lake on the east.

While the numerous difficulties which were encountered by reason of the existence of the Black Swamp have been eliminated, many localities on the line of the re-location have been



Home Life of the Construction Force in the Canal Zone.

THE PANAMA RAILROAD—(Cont'd).

troublesome. Four large embankments have been constructed, ranging from 1,500 feet to 5,500 feet in length. These "fills" gradually sunk into the foundation as the work progressed, until the footing had to be widened, so as to establish a counter-weight.

The original intent of the engineers was to carry the railroad through Culebra Cut on a shelf left in the side of the Cut. The disintegration of the walls of the Cut caused this shelf to disappear into the Cut, and it was found necessary to establish the railroad on the other, or east, side of the Culebra hills, thus leaving the line of the Canal, where it extends through Culebra Cut, from one to three miles. A short line of the railroad runs from the main line down to Gold Hill. But, short line, or long line, the hills, marshes, jungles, vegetation and climate make the work of railroad building in the Canal Zone unusually difficult.

The railroad ties are hardwood, so hard in fact that they have to be bored for the spikes. Lignum vita, polvillo, corteza and balsam woods received from Colombia were used. Ties could have been obtained on the Isthmus, but no company could furnish them in large enough quantities. Seventy-five thousand Bayahonda ties were obtained from Santa Domingo.

The Continental Divide is crossed, when opposite Culebra, at an elevation of 240 feet above sea level. The passenger train service time between Colon and Panama is two hours and twenty-five minutes.

All of the 70,000 shares of stock in the railroad are held by the United States Government, except those known as the Directors' Qualification shares, which are held, one for each director, at the disposition of the Government.

The railroad is operated under a charter granted by the United States of Colombia, which expires in 1966, and, as the railroad company owns nearly all of Colon, it is through this channel that the United States of America will become the owner of that city.

The Panama Railroad crosses the Chagres River at Gamboa on a bridge 1,320 feet long—consisting of fourteen 80-foot spans and one 200-foot span.

The oil pipe line from Panama City to Colon runs along the railroad right-of-way.

PROPOSED CANAL ROUTES BETWEEN THE ATLANTIC AND PACIFIC.

From the earliest days of navigation along these shores, means have been sought for connecting the two oceans.

The uncertain and changing conditions of local governments have been almost as much of a difficulty in this work as were the

PROPOSED CANAL ROUTES—(Cont'd).

distances between the oceans and the mountainous character of the country to be traversed.

The various routes had their champions, but it would seem to a lay mind that the United States Government was able to make use of the really best and least difficult pass of the mountains.

Below will be found the names of the various routes, with their strongest claims for the Canal, beginning with the most southern:

Darien:

Two routes.

Elevation, 1,100 and 1,250 feet.

Costly viaduct.

Tunnel, ten miles.

Tuyra:

Elevation, 750 feet.

Out of Panama Bay opposite Pearl Islands.

Tuyra River, forty miles.

Cue River, eastward to source.

Through height of land to Atita River in Colombia.

Forty miles to Gulf of Darien.

Canal, fifty-five miles long.

Tunnel, two miles.

Panama (the present canal route):

Thirty-five miles.

Elevation, 300 feet.

San Blas:

Elevation, 1,140 feet.

Tunnel, ten miles.

Canal, sixteen miles.

River, ten miles.

Nicaragua:

Elevation, 153 feet.

Greytown on Atlantic, by way of San Juan River to Lake.

Nicaragua to River Lajas, by cut through Continental Divide, twelve miles, into Rio Grande to Brito, ten miles north San Juan del Sur on Pacific.

Length, 187 miles.

Corinto:

To Lake Managua.

By river to Lake Nicaragua.

By river to Atlantic.

Not feasible.

(C)

Sanitation.

SCIENCE OF HEALTH.

The science of health has been carried to an unusual degree of perfection when it becomes a disgrace to get sick; a disgrace to the medical profession, to the surrounding conditions that cause that result, and last, if not least, to the victim. Yet such is the condition of affairs on the Canal Zone.

In a territory of daily inspection, where the doctor is overlord and where his ideas of sanitary conditions must be satisfied before any work can be done, where the physical condition of each individual is a matter of record, and where the wanderers who have no visible means of support are barred—the first symptoms of ill health become a matter of immediate importance.

The Zone was placed under the jurisdiction of the medical fraternity before any work was attempted, and no work was done at any point until those authorities gave their consent. The result has been what one would naturally expect. The health of the Zone has progressed from being the hotbed of fevers until its record is better than those of the large cities of the temperate zone.

The progress of sanitary science, combined with the enthusiasm of the sanitary officers, has almost changed nature itself, and the mechanical engineers have made no greater advance in changing the geography of the earth than have the doctors in altering the health conditions of the human family.

The fight on mosquitoes has practically eliminated yellow fever, malarial fever and their kindred. Vaccination has finished smallpox. The fight on rats and fleas wiped out the bubonic plague. It would seem to the lay mind that diseases on the Canal Zone will soon become a "luxury" if the present progress toward health is continued.

Sanitary Department.

The Department of Sanitation had the care of the health of the Canal Zone and of the cities of Colon and Panama, and had charge of all hospitals and quarantines.

It supervised cutting down brush, draining swamps and covering ground with oil. All persons living in the Zone were vaccinated, quarantine was made effective; drinking water was supervised, streets paved, roads constructed and sewers established.

Sanitary Department—(Cont'd).

A large hospital was conducted at Colon, another on the high hills of Ancon, a sanitarium was maintained on Toboga Island and a leper colony was located at Palo Seco.

When the United States of North America took charge of the Panama Canal Zone—benefiting by that Government's experience in Cuba, and realizing the necessity of destroying, in-so-far as possible, the pest of mosquitoes, if the healthfulness of the workmen employed in the construction of the Canal was to be preserved—the first effort of the sanitary department was to dispose of the mosquito. Under the old order, during the French occupancy, the feet of the beds in the hospitals were placed in cups holding water to protect the patients from the pest of ants. Here, as in other unusual locations, was the breeding place of the mosquito. Even the font of holy water in the cathedral contained "wigglers."

Beginning with the old French Canal Headquarters Building in Panama City, and gradually extending this work to other buildings in the cities and along the route of the Canal, a system of fumigation was inaugurated. With the screening of the houses, draining of swamps, a generous use of crude oil over damp ground, and close watchfulness over the general health conditions, good results were soon attained.

After the Sanitary Department had the health conditions of the Zone well in hand, a standing reward of \$50.00, to be paid in gold, was offered for information of a case of yellow fever reported by any one not connected with the health department. To show how clear of this disease the territory had become, no reward was ever claimed.

The trustees of the American Medicine Gold Medal awarded the medal for 1912 to the chief of the United States medical corps in the Canal Zone, as "the American physician who had performed the most conspicuous and noteworthy service in the domain of medicine in the last year."

MOSQUITOES.

Means of transmission of malaria and yellow fever.

Malaria fever, known also as chills and fever, fever and ague, intermittent, remittent and pernicious fever.

Over fifty families of mosquitoes classified.

One female lays many thousand eggs a year.

Twelve generations are produced annually.

Anopheles cause malaria.

Stygonia cause yellow fever.

MOSQUITOES—(Cont'd).

The propagation of malaria is according to the following cycle:

1st. The mosquito bites the patient suffering from malaria. In nine days the mosquito becomes infected.

2d. She lays her eggs in standing water.

3d. The larvæ, "wigglers," are hatched. They pass twelve days in their journey to mosquito life, all this time in water.

4th. The full grown female mosquito is then ready to continue the cycle.

The female mosquito is the biter. The blood sucked from human beings seems necessary for the development of her eggs.

The fight against malaria, as exemplified by the mosquito brigade on the Canal Zone, passes through five stages:

1st. To prevent her from laying her eggs. To do this stagnant water must be eliminated, swamps drained, and low places filled up.

2d. Cover all stagnant water with oil to kill the wigglers. The wigglers live in the water twelve days while on their road to maturity. They grow, they eat and breathe. To breathe, they must come to the water surface once a minute. If they breathe oil, they are "goners."

3d. Carrying the fight against the grown mosquito, swatting her wherever found.

4th. Preventing mosquitoes, by means of screens, from getting to possible future patients.

5th. Isolating the new patient from the mosquito.

The yellow fever mosquito is more easily and more successfully fought than the malaria mosquito, for it is a "civilized" mosquito, living near human habitation. Modern sewerage, water systems, filling of low ground, etc., are the means.

Addendum.

Two hundred million acres of land in the United States are either swamp land or subject to overflow. Two hundred and fifty thousand people in the United States die each year from mosquito bites.

These acres can be added to the wealth of the country, as well as can the money spent for medicine, medical service, and loss of labor.

Moral: Swat the mosquito!

TYPHOID AND THE FLY—

THE FLY AND TYPHOID.

The fly, a carrier of germs of disease.

Great epidemics of typhoid have been traced to the fly.

The law of nature, "No filth, no flies."

Swat the fly. Remove the filth.

Eight days develops a fly from the egg.

Inoculation has proven successful and is compulsory in the armies of the United States and Great Britain.

The voracity of the fly is unlimited; if the supply of food in sight is greater than the capacity of its stomach, it promptly disgorges and begins its eating all over again.

BUBONIC PLAGUE.

The bubonic plague is spread by infected fleas. These fleas take refuge on rats. These nomadic animals cruise into all ports, whether in the tropical or temperate zones, by means of ships.

It would seem that the natural advance of medical science will soon ensure the elimination of not only rats and mice, but of their compatriot the cat, and possibly have a strong restraining influence on that best friend of man, the dog.

Great is the medicine man!

HOOK-WORM AND HEALTH.

The hook-worm is a parasitic worm which hooks on the wall of the small intestine and absorbs the blood of the patient, causing severe anemia or lassitude. This malady is prevalent among the negroes and ignorant whites of warm tropical countries, and is a contagious disease.

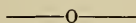
Relief and cure are obtained from some of the products of the eucalyptus tree.

SMALLPOX.

This much dreaded disease is eradicated by enforced vaccination.

(D)

Historical Summary.



THE FRENCH CANAL.

In 1876, France sent Lieutenant Wyse to the United States of Colombia to obtain an inter-oceanic canal concession.

In 1878, the Colombian government granted to "The Civil International Inter-Oceanic Canal Society" the exclusive privilege of constructing a canal from ocean to ocean thro Colombian territory.

In 1879, de Lesseps became connected with the project.

First dirt was thrown January 1, 1880.

The Canal Company failed in 1888.

From that date to the date of sale to the United States only enough work was done along the line of the Canal to hold the concession.

The French organization was a civil company. The money to build the Canal was raised in France by popular subscription. The Canal work was let to private contractors.

The authorities of Colombia, the officers of the Canal Company and the contractors, all combined to make money at the expense of the welfare of the Company.

The engineers did not understand the necessities of the undertaking. No data of past expenses attached to work of such magnitude and attended by such great difficulties was obtainable. They had no such machinery as that used in the present work. They planned a sea-level canal, which is practically impossible even in this day of plentiful money, high grade machinery, honesty in the administration of executive affairs and a government with unlimited resources in power.

The plans of the French Company provided for a bottom width of the Canal of 150 feet, whereas, under the United States' present successful arrangement, the bottom of the Canal varies from 300 feet to 1,000 feet in width. The French also provided for an ocean water level Canal, damming the Chagres River at some point before it entered the locality of the Canal. The unusual tide conditions were supposed to be overcome by a series of obstructions in the Canal itself. These tide conditions were a heavy problem. The mean level of the two oceans was the same, but the average tide of the Atlantic was about two feet, while that of the Pacific was nearer 22 feet. The rush of these waters four times a day presented a heavy problem that does not occur in the present Canal, with its locks and elevations.

The great unhealthfulness of the Isthmus, the small percentage of men and officials who were able to work (at times only

THE FRENCH CANAL—(Cont'd).

about twenty-five per cent being on duty, the remainder being in hospitals or debilitated), and with graft rampant in every department, in addition to the natural difficulties to be surmounted, all combined to bring about a condition of affairs which culminated in the collapse of the French Company.

After their troubles with graft, dishonesty, sickness, weather conditions, floods, and unknown mechanical problems, the officials of the Company began to feel confidence in the future success of the project, when the money became exhausted. Stock influences, scandal, the poverty of the common people of France, who had furnished the money by popular subscription, and the latter's loss of faith in the enterprise and its officers, all combined to throw the Company into the hands of a receiver. De Lesseps and his compatriots were brought to trial and disgraced before the world, and de Lesseps ended his days in an insane asylum, grown old with honor, but "caught in bad company"—becoming the mark for every dissatisfied person.

As the progress of the world made more evident the necessity for an inter-oceanic canal, and as all evidence pointed to the United States as the logical builder, many efforts were made to sell the remains of the French Canal and its franchise to that country. But, true to their past traditions, each attempt was in the nature of an over-valuation.

The rivalry of the two Canal routes of Panama and Nicaragua became more pronounced, until, feeling that no bargain could be made for the first named route, a contract was almost completed for the second, when the holders of the Panama Canal stock became suddenly panic-stricken and consented to a contract by the terms of which the United States of America seems to have made a splendid business investment.

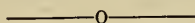
The amount of excavation done by the French shows that they did some good work, but they lacked the advantages made possible by the great advance of the present age in machinery and sanitation. Much of the machinery and many of the houses they constructed were put to practical use by their successors—the United States Government—after repairing the ravages caused by the many years of dis-use and exposure in a tropical country.

FERDINAND DE LESSEPS.

One of the most notable figures connected with the history of the French Canal's inception and subsequent development was Ferdinand de Lesseps, noted French diplomat and engineer (1805-1894), who was really the first man to undertake the pursuit of the work. De Lesseps superintended the construction of

the Suez Canal and in this was considered highly successful. He next undertook the building of the Panama Canal. He estimated the probable cost of its construction to be \$120,000,000. Instead, \$280,000,000 was spent on it under his direction and then the Company failed.

Subsequently, he was tried and convicted of fraud and bribery.



THE ACQUISITION OF THE CANAL ZONE BY THE UNITED STATES OF AMERICA.

Chronology.

Ship Canal treaty with United States:

Signed November 18, 1903.

Ratified by Panama December 2, 1903.

Ratified by Senate of the United States February 23, 1904.

Ratified by President of United States February 25, 1904.

Ratification exchanged February 26, 1904.

Treaty proclaimed February 26, 1904.

United States occupied May 19, 1904.

* * * * *

In 1904 the United States of America bought the Panama Canal Zone from the new Republic of Panama.

This is a strip of land five miles wide on each side of the center line of the Canal—a total width of ten miles—extending across the Isthmus from deep water in the Atlantic to deep water in the Pacific. The republic of Panama received for this strip of land \$10,000,000 in cash and the payment annually, beginning nine years after the signing of the treaty, of \$250,000—this payment to extend to perpetuity.

Terms.

The cities of Panama and Colon and their harbors were excepted.

The right was granted to the United States to occupy and control any other lands and waters outside of the Zone which might be necessary or convenient for the construction, maintenance and operation, sanitation and protection of the Canal or auxiliary canals or other works necessary for the Canal. Also all islands in the limits of the Zone including the islands of Perico, Naos, Culebra, and Flamenco in the Bay of Panama.

Panama granted to the United States the right to use such rivers, lakes and other bodies of water in its limits for navigation, water supplies and power needed for the operation of the Canal.

Panama granted to the United States a monopoly for construction, maintenance and operation of any system of communi-

cation by means of canal or railroad across its territory between the Caribbean and the Pacific ocean.

Panama agreed to United States supervision of sanitary conditions and maintenance of good order in Panama City and Colon. Panama granted to the United States its rights to the Panama Railroad and its properties. (See page 45.)

The United States took charge of the Panama Canal Zone May 4, 1904.

The Canal Zone has since been enlarged by the submerged areas contained in Gatun Lake that extended outside the regular outline of the Zone, as per the terms of the treaty between the United States and the republic of Panama. This district includes principally the valleys of the Chagres, Gatun and Trinidad rivers, and contains approximately seventy square miles.

The 1912 census gave the Zone a population of 61,279—almost all the countries of the earth being represented.

SUEZ CANAL.

For purposes of comparison between the Panama Canal and that other inter-oceanic canal, the Suez, the principal facts relative to the building of the Suez Canal may be of interest and are appended for that purpose.

The Suez Canal was begun in 1860 and finished in 1869. It is a tide-level canal, passing through a natural depression between sand hills. No cuts exceeded fifty or sixty feet. The sand was carried out of the cut in baskets on men's backs. Labor was furnished by the Khedive of Egypt, who made this work compulsory on his subjects; 25,000 to 30,000 men was the greatest number of men employed at one time; drinking water was the most troublesome question; 80,000,000 cubic yards of earth was removed at a cost of \$100,000,000. The canal was excavated 66 miles, dredged through swamp 14 miles and passed through a lake for a distance of eight miles. There was no rock excavation. It has no locks and little tide.

It was built seventy-two feet wide at the bottom, one hundred and ninety-seven feet wide at the top and the depth of water was twenty-six feet. It shortened the distance to India from 11,379 miles to 7,638 miles—a saving of 5,751 miles. During construction, the towns of Port Said and Suez were said to be the two pest-holes of earth.

The same quantity of earth excavated in building the Suez Canal was practically excavated each year during the building of the Panama Canal.

It is supposed that a canal was built along the route of the Suez Canal 600 B. C. and that it continued in use for 1,000 years.

January 1st, 1912, the Suez Canal toll rate was reduced to 6.75 francs per net registered ton.

PART II.

ZONE AND REPUBLIC.

- (a) The Caribbean Sea.
- (b) The Canal Zone.
- (c) The Republic of Panama.



- (a) Ruins of Spanish Barracks at Porto Bello.
(b) Plaza in Colon (the Tree in the Center of Photograph is a Camphor Tree).

(A)

CHARACTERS ASSOCIATED WITH THE HISTORY OF THE CARIBBEAN COAST.

Associated with the history of this wonderful land were certain characters whose names are inseparably linked therewith. A sketch of this locality would be incomplete without at least brief reference to such men as Vasco Nunez de Balboa, the explorer; Henry Morgan, the buccaneer; Edward Vernon, the English admiral, and William Kidd, the pirate.

From the beginning of the 16th Century to well up within the 18th Century the entire Spanish Main, which comprised the islands of the Caribbean and the corresponding coasts of Central and South America, or at least those parts which were inhabited, was a veritable hotbed of piracy and martial disturbances.

Vasco Nunez de Balboa.

Vasco Nunez de Balboa was among the bravest and most successful Spanish discoverers.

He was born in 1475 and was executed by being beheaded in 1517.

He discovered the Pacific ocean, September 26, 1513.

A short while later he dismembered two ships and had them carried across the Isthmus on the backs of his men. Reaching the western coast, he reassembled his two vessels and set sail on the Pacific—the first known European to navigate that great ocean.

His jealous contemporaries finally succeeded in putting him in prison and he was executed at the age of forty-two.

Buccaneers of The Caribbean.

The buccaneers were bands of piratical adventurers of different nationalities united in opposition to Spain who maintained themselves originally in the Caribbean, but in later days also laid waste to the Pacific shores of Central and South America.

Spain sent a fleet of ships twice a year to the new world for treasure. These fleets were convoyed by men-of-war, and there were at times forty or fifty ships in the fleet.

They called at the various ports of the Caribbean for their treasure and merchandise. Peru sent its treasure to Panama, from whence it was brought overland to Porto Bello, on the Caribbean.

The buccaneers considered these ships their legitimate prey. They were at all times on the lookout for a ship not properly guarded or that had become separated from the fleet.

CARIBBEAN COAST CHARACTERS—(Cont'd).

An annual fair was held in Porto Bello during these days and the wealth of the merchants who exhibited and traded there was almost unbelievable, while the volume of business transacted ran well up into the hundreds of millions of dollars. The merchandise bought, sold and traded at these fairs was mostly shipped back to Spain via Havana.

Henry Morgan, Buccaneer.

Henry Morgan was a Welchman, brave and unscrupulous. He was kidnapped when a boy and carried to Barbados. He later escaped and joined the pirates. His first experience in piracy was in command of small ships which did little damage. Continued success caused other freebooters to join his command until he became of importance. Morgan attacked and captured Porto Bello on two occasions. On the first occasion the Governor of the City of Panama sent a messenger to him asking him for a sample of the weapons that had brought him such wonderful success. Morgan sent him a pistol and a small quantity of ammunition, with the message that he, Morgan, would later come to Panama City for their return. The Governor sent them back to Morgan, saying that he did not need them and that Morgan would show good judgment if he did not attempt to come to Panama City.

Morgan's second attack on Porto Bello (1671) was made from the land side. Among his prisoners, taken before they could gain the shelter of the forts, after Morgan's attack, were members of the religious orders—women as well as men. Morgan had ladders made, long and broad enough for two or three of his men to ascend at one time. These ladders he forced the nuns and priests to carry and place against the walls. His own men scaled the forts or castles, and after a brief and bloody battle captured them. They spent days there in the pleasures of loot and drink and rapine, sparing no one. During this time the place could have been easily recaptured by the Spaniards, had the attempt been made.

They then sailed for the mouth of the Chagres River, destroying Fort Lorenzo and the Spanish town of Chagres, located at the river's mouth. In boats, they started up the river on their way to Panama City. They expected to subsist on their way by foraging and to be no more than two days en route.

Contrary to their plans, they were eight days on the way. The Spaniards had retreated and removed or destroyed all provender and the piratical force was in sad straits for food—being forced to subsist on leather as their principal diet, backed up by a drink of water. After passing the summit, they found forage plentiful.

CARIBBEAN COAST CHARACTERS—(Cont'd).

The Governor of Panama met Morgan and his men before the city. The Panaman force consisted of two troops of cavalry, four regiments of infantry and some Indian allies. The cavalry became mired in a swamp and the sharpshooters of Morgan soon caused the Panaman force to retreat into the city. The fighting within the city was from house to house and was very sanguinary; but Morgan forced a surrender in a few hours. Then his men began their orgies of drinking and rapine, and continued these actions for a month.

Finally they returned to the Atlantic side of the Isthmus, taking booty to the limit of their carrying capacity.

The most of the jewels and government treasure of the City of Panama were taken to sea in ships before Morgan and his men arrived, altho more was left than they could carry away. The division of the loot from the City of Panama among the pirates caused much dissatisfaction among them, showing that the old adage of honor among thieves did not always apply to the established rules of piracy. The sack of old Panama City, coming as it did at a time of peace between England and Spain, caused such a strong feeling against piracy that England proceeded to extreme measures to stamp it out; but without great success, however, until Morgan was commissioned to accomplish that result, on the principle, it is presumed, that no one knows the ways of the thief quite as well as the thief himself. Morgan, as Governor of Jamaica, had the pleasure of punishing many of his old associates for piracy. He died as Sir Henry Morgan.

Edward Vernon, English Admiral.

Among the bravest and most spectacular characters of this period was Edward Vernon—Statesman and Soldier. He took part in expeditions in various portions of the world. While he was a member of the English Parliament, in a speech criticising the English government, he claimed he could take the Spanish stronghold of Porto Bello with but six ships, and he was sent by the Minister to prove his words.

He attacked Porto Bello (1739) and captured it after only two days' bombardment, losing but seven men.

He became an English hero and died in 1757.

William Kidd, Pirate.

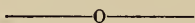
William Kidd was the son of a Scottish minister. He went to sea when a boy. Later when sent in command of a warship to overthrow the pirates, he, himself, turned pirate. The stories of his wealth, his cruelty and his depredations have been immortalized in American fiction.

He was captured in Boston and hanged in London in the year 1701.

CLOUD FORMATIONS.

Any book, issued as this one is for the purpose of giving information that will add to the knowledge and pleasure of the holder as he passes along the line of his journey, would not be complete if it failed to mention the wonderful cloud formations which are to be seen in the warm countries of the tropics through which we pass en route to Panama.

The clouds will bank over the water along the line of the horizon in heavy masses and are of delicate shades of coloring. Cities, villages, fortresses, spires, animals, figures of almost any form, can be plainly seen in the clouds—not the fancy of one person's imagination, but easily to be pointed out and to be seen by all; and as these forms change from child to old man, or from horse and rider to horses and chariot, or other as positive forms appear in succession, the view of the clouds—forms—colors—and the wonderfully clear blue of the waters below—unite in creating successive pictures that will probably never be effaced from mind.



APPROACHING COLON FROM THE SEA.

When approaching Colon from the Caribbean, one first sees the high hills of Porto Bello, twenty miles to the south, with its large rock quarries that furnished the rock for the Gatun Locks; then the long circular sweep of the land becomes apparent, with the light house to the right, the low ground in front, and the line of low hills sloping back from the coast; next the buildings and long rows of royal palms along the shore drive and the mass of vegetation in the background. Gatun Dam occupies the center of this glorious stage-setting.

Entrance to Colon harbor is made through the breakwater.

After a visit from the quarantine officers, with their permission, a landing is made at the wharf in Colon; that is, provided the boat is a foreign boat, or an American boat that has touched at a foreign port. An American boat direct from the United States, not having landed at any foreign port, lands at the wharf in Cristobal. There is little difference in the location, however, as the wharves are side by side.

After an examination of the baggage by the customs officers, the passenger is permitted to proceed as he desires,—either to a hotel in Colon, or by rail across the Isthmus to Panama City.

It would seem best to stop temporarily in Colon, thereby making return unnecessary, if one desires to visit Colon and vicinity before proceeding up the Pacific coast.

(B)

COLON.

Pointers and Places of Interest.

Wireless tower.

Ocean drives.

Plaza; one block wide, two blocks long, well kept and filled with strange and interesting vegetation.

Rows of royal palms.

Mt. Hope (formerly Monkey Hill) Cemetery.

De Lesseps statue of Columbus and Indian maiden.

Oil tanks filled with oil by a pipeline from Panama City, laid along railroad right-of-way.

Tide varying from two feet to, at times, none.

Native bathing beach east of wireless station.

Hospital near wireless station.

Take coach—rates by trip or hour, ordinary trip ten cents gold—see rates posted in coach. If possible, choose an English speaking driver. Be sure to make explicit contract before entering coach.

Have it specifically understood with the driver whether you are to pay in gold or silver, and how much. (Ratio gold and silver, two to one.) Each new stop you make may liable you for a new "fare." Avoid all controversies with driver; otherwise you may find yourself suddenly haled into a Panaman court, whose operations may be difficult for you to understand.

Colon is 22 miles west of City of Panama.

* * * * *

Colon of today is the Aspinwall of earlier days—that hotbed of disease and death—where heat and dirt and marsh and water all combined against mankind; where fevers decimated and climate enervated.

Aspinwall was located on Manzanillo Island and was separated from the mainland by several miles of swamps. It was founded in 1850 by the Panama Railroad Company, and was named after W. H. Aspinwall, one of the principal shareholders of that company.

The arrangements of the present city of Colon are very different. The census of 1911 gives it a population of 17,748; the streets are paved, swamps filled, sewage provided for, water and electricity everywhere, and sanitary conditions almost perfect. In fact, all the general conditions surrounding the old town of Aspinwall are changed, except the downpour of water. Even the American Government cannot control that.

This locality has probably the heaviest rainfall of any on earth, with the possible exception of Porto Bello. The town is

COLON—(Cont'd).

located only three or four feet above the Caribbean, and its natural health conditions are the worst.

Colon is the second city of the Republic of Panama. Like the City of Panama, it is located on a tract of land surrounded by United States territory.

The Panama Railroad Company filled in swamps, thereby connecting the original island of Manzanillo, on which was located the town of Aspinwall, to the mainland. By the terms of the Panama Railroad Company's lease, almost all the land on which Aspinwall was located was to revert to the railroad company after a certain term of years. Since the French Canal Company transferred these rights with its canal property to the United States of America, that Government in time will become owner of the ground upon which Colon is built. (See page 47.)

This makes a peculiar international situation—that of one nation owning in fee simple a city in another nation's territory, and in addition this city being surrounded by the first nation's territory. This situation applies to both Colon and the City of Panama.

However, there need be little fear of international complications in this case, as the United States by right of treaty exercises a fatherly control over the welfare of the Panaman Government, to the end that good health and good behavior may endure.

Native hotels are good enough, if the guest is not too particular, and he can imbibe a touch or two of local color there. If he prefers no question as to the standard of his entertainment, the government supports a hotel here, as at Panama City, that will satisfy the most fastidious. (See page 15.)

After locating, get a coach—first making your contract with the driver, per trip or hour, and specifying whether payment in gold or silver is understood.

Drive over the paved streets and surrounding roads, and try to imagine what old Aspinwall in its flowery days must have been, with its swamps and sickness. Drive to Mt. Hope cemetery and compare, if you can, this modern and beautiful burial place with the old place of death called Monkey Hill.

Monkey Hill was the final place of deposit—if such a term may be used—for such dead as were disposed of in the old days of Aspinwall.

Drive through Cristobal and along the entrance to the Canal, past the large warehouses of the Commission. Notice the oil tanks on the higher ground, to which oil is brought from Panama City by pipeline laid on the right-of-way of the railroad.

Drive along the winding streets, past the de Lesseps statue of Columbus pointing toward the rising sun and telling the In-

COLON—(Cont'd).

dian maiden of the wonders of the worlds beyond the sea. Continue along the sea drive, by the rows of royal palms, down to the hospital, past the wireless station, if you choose. And, when you return to your hotel, you will probably agree that many interesting things, in history and in fact, are brought to your mind, even in Colon.

Gold and Silver Ratio.

In the Republic of Panama the ratio of gold and silver is 2 to 1, or one dollar gold equals two dollars silver, or ten cents gold equals twenty cents silver.

CRISTOBAL.

Cristobal is the Zone town adjacent to Colon—the two towns forming the complete name of Christopher Columbus. Cristobal is a modern working city of large interests.

The ice factory, the bakery, the laundry, and the great storehouses of the Isthmian Commission are here, all parts of which business are handled with such close attention to the most minute details that managers of large business interests might here get many good ideas for application to their own plants.

PORTO BELLO.

Named by Columbus, meaning "Good Harbor."

Twenty miles east, along coast from Colon.

A natural harbor and bay between Buenaventura Island and Drake's Point. Good depth of water and easy of entrance.

Founded 1584.

Porto Bello, with Colon, two rainiest places on earth.

Was Atlantic port on main line of travel from South American Pacific coast ports to Spain.

Grew rapidly in importance and became a great depot for gold and silver en route to Spain, brought overland from Panama.

Great fairs were held once a year and immense quantities of business were transacted.

Twice a year, a fleet of merchant ships convoyed by war vessels was sent thro the Caribbean to collect the treasures, making Porto Bello at this time.

Destroyed by Morgan 1671. (See page 60.)

Morgan first attacked and sacked Porto Bello, then San Lorenzo, the fort at the mouth of the Chagres River, and then the old city of Panama.

Destroyed by Admiral Vernon of English Navy in 1739. (See page 61.)

PORTO BELLO.**Points of Interest.**

Picturesque ruins.

Remains of fort.

Sea wall.

Old cannon.

Location of quarries from which stone was taken for concrete of Gatun Locks.

Porto Bello may be reached from Colon by boat. This is frequently an unusually rough passage; in fact, it is a popular saying in the Canal Zone that one who can make this trip without experiencing mal-de-mere is immune from that unpleasant discomfort.

FORT LORENZO.

Formerly at the mouth of the Chagres River.

Here boats were taken for the voyage up the river on the way to the City of Panama, previous to the building of the Panama Railroad.

It was garrisoned by the Spaniards, and was destroyed by Morgan and his men prior to their march on Panama City.

It was later destroyed by Admiral Vernon of the English Navy.

Morgan's success in attacking this fort was hastened by an accident. One of his marksmen, in a spirit of fun (?), shot an arrow, to which was attached a blazing torch, into the fort. As a result, fire was set to a thatched roof and soon the entire enclosure was ablaze. In the succeeding excitement a surrender of the fort was easily attained.

THE TOWN OF OLD CHAGRES.

A seaport at the mouth of the Chagres River.

It was of considerable importance before the opening of the railroad.

Destroyed by Morgan, 1671.

Destroyed by Admiral Vernon, 1740.

MOUNTAIN ELEVATIONS OF THE ZONE.

The Pacific coast chain of mountains that extends from North to South America loses its height when passing thro the Canal Zone. While the republic of Panama contains peaks of 8,000 and 9,000 feet altitude, those of the Zone can hardly be classed as more than hills. But what they lose in altitude they gain in the difficulty of ascent; one can hardly fight his way up and down their sides thro the dense jungle surrounded by heat and the humidity of the atmosphere without feeling quite a respect for them.

MOUNTAIN ELEVATIONS—(Cont'd).

Below is a list of the twenty-five highest elevations in the Zone with a numbered index of their location on the map on page 24.

Inside the Canal Zone.

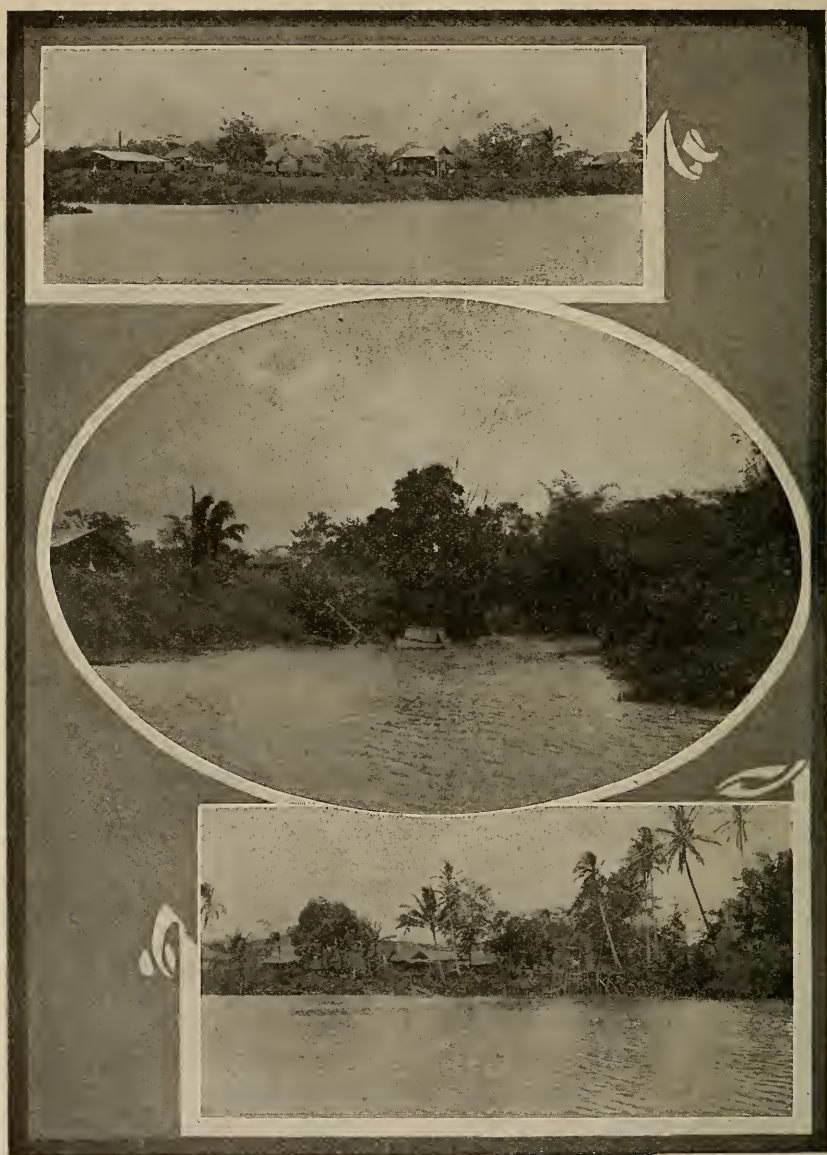
No.	Name.	Elevation (in feet above sea level).
1	Balboa.	1149
2	Cobra.	1129
3	Salvador.	994
4	Gordo.	972
5	Gato.	929
6	Casava.	906
7	Colombia.	900
8	Pienzo.	883
9	Semaphor.	800
10	Mandinga.	797
11	Hormigueros.	770
12	Gausno.	741
13	Caimitillo.	716
14	Cocoli.	690
15	Jaugua.	663
16	Ancon.	654
17	Gold Hill.	650
18	East.	608
19	Morales.	598
20	Luisa.	593
21	Gatun.	593
22	Pina.	574
23	Victoria.	541
24	West.	537
25	Teal	536

Outside the Canal Zone.

26	Salud.	1151
27	Iron.	1150
28	Santa Rita.	883
29	Chinal.	748
30	Daniels.	587
31	Lindero.	522
32	Gigantic.	512
33	Espinosa.	247

ZONE LANDS.

The ownership and control of Panama Canal Zone lands are based on the old Spanish laws.



Tropical Views.

ZONE LANDS—(Cont'd).

Their measurement is based on the hectare. A hectare is 2.47 acres.

There are three classes of lands in the Zone: (1) the public lands, (2) lands belonging to the Panama Railroad Company and (3) private lands.

In the Zone are 436 square miles. Seventy-three square miles of land belong to private ownership, leaving 363 square miles owned by the United States or by the Panama Railroad Co., of which 96 square miles are occupied by the Canal.

The ground of the Zone is not suitable for farming, because of the condition of soil and general configuration of country.

Perpetual title cannot be assured.

The system of taxation must conform to the old Spanish system, as in Panama. This is not satisfactory to Americans, and other people are not desired as citizens.

Strong influences consider it best to use the Zone solely for the operation of the Canal.

RAINFALL.

The seasons of the Canal Zone are divided into the wet and the dry. The dry season corresponds to the winter months of the northern hemisphere, and the wet season to the summer months.

During the dry season, the weather is pleasant and enjoyable, varied occasionally by showers. The sun may be bright and the air hot during the day, but at sundown come cooling breezes, and the night air calls for more and heavier clothing.

During the wet season there seem to be periods when "the heavens open and the waters descend."

The record of rainfall at Ancon for 1910 was 91 inches; of the central division 129 inches; while that of the Atlantic section was 158 inches. When abnormal records of rainfall are mentioned, Porto Bello is always thought of. The records at Porto Bello for 1909 and 1910 were respectively 170 and 237 inches.

At Porto Bello, November 29, 1911, 2.48 inches of water fell in three minutes and the total precipitation from this "shower" was 7.6 inches.

The records show that one of the greatest rainfalls on the Isthmus occurred on December 28th and 29th, 1909, when 10.86 inches of water fell in twenty-four hours.

WINDS.

The average velocity of the wind on the Canal Zone is not great.

During the year 1910, the average velocity of the wind was, at Ancon 7.3 miles per hour, and at Cristobal 9.8 miles per hour,

while the highest velocity during the year was 39 miles per hour, which was attained at Culebra.

TEMPERATURE.

Range of temperature during 1910:

Ancon 63° to 96°

Culebra 61° to 94°.

Cristobal 66° to 92°.

There is no great difference between wet and dry season averages, but the daily variation is greater in the dry season.

WATER RESERVATIONS.

At convenient points where the topography of a valley made it feasible, water reservations were established.

The immediate water shed was policed, all brush and unsanitary conditions removed, and these reserves have become very attractive and are both interesting and instructive to the tourist.

VINES.

The number, the variety and the characteristics of the vines of the Canal Zone are legion. It is a far cry from the vine as small as one's finger that meanders through and around the grass and jungle, never growing larger but always growing longer, to the immense vine, bigger than any rope, that climbs the largest tree and by its strength entwines and chokes its life out; vines that cling and kill; vines that cover the trunk of the tree with their leaves interlapping until the whole surface is shut away from light and moisture and it dies from lack of nutrition.

ANIMALS.

A short list of the animals includes deer, tapirs, ant eaters, lizards (iguanas), monkeys, wild hogs, mountain cats, opossums, ground hogs, armidillos, alligators and snakes.

There is no great danger to be expected from the wild animals of this region.

BIRDS.

There are many birds and of brilliant plumage, but no sweet songsters. Their cries are harsh. Parrots, paroquets, wild turkeys and pheasants are the principal birds.

MINERALS.

The country has great mineral wealth, but the mines are undeveloped.

INDUSTRIES.

Cattle raising and the shipment of hides form two important industries.

CENTIPEDES AND MILLIPEDES.

These are two orders of articulates related to insects, worms and spiders. They have fang-like prehensile jaws, perforated at the extremities to allow the passage of the liquid venom into the wound that they inflict. They are carnivorous and poisonous, and inflict a severe and oft-times fatal bite. The bite ordinarily yields readily to an application of ammonia, however.

TARANTULAS.

Tarantulas belong to the mining section of the spider family. They are found in dry places exposed to the sun. They live in underground passages.

The bite is painful but not dangerous.

WARNING.

It is the custom in the tropics to shake the clothing and shoes before putting them on, in order to dispose of the possible presence of centipedes, millipedes, tarantulas and other unwelcome guests.

The poison of insects and animals inhabiting tropical countries is not so virulent as those of the temperate zones.

ANTS.

Perhaps comparatively few readers realize that the ant population greatly outnumbers any and every other specie or family among the inhabitants of the earth. In the temperate zone each field contains its teeming billions and each hill its millions.

In the tropics the ant is omnipresent and ranges in size from the one almost too small to be seen to those that travel in great armies, destroying all life as they advance. Some of the latter species measure more than an inch in length.

For our purpose there are two general families of ants, the black and the white. The large shiny black ants of the tropics are leaf-cutters that cause great havoc among fruit-bearing trees as well as to general vegetation. Their devious paths, fully twelve inches in width and of unknown length, packed solid by the tread for centuries of billions of these creatures, are so hard and smooth that travelers, struggling through the dense growth of the jungle, are forced to envy their well-beaten road. A description of their working methods will be found in the chapter on Balboa Hill. (See page 76.)

The White ant, or Termite, lives away from the light of day. It builds concealed roads or makes tunnels of mortar

when compelled to pass from one location to another or along the trunk of a tree until it can enter the body of the wood. If a tree is attacked by these Termites, it might as well give up hope of life at once, for its death is only a question of time. The wooden posts under the Canal quarters have never been made immune from the attacks of these ants. An examination of these supports will probably soon locate an earthen tunnel the size of a wooden pencil running up its side. By breaking this tunnel, the Termites may be seen. An inspection of any furniture that has been in the Zone for some time will probably demonstrate the Termite method of destruction.

For several years during the construction of the Canal, a suspension bridge swung across the Cut at Empire. The cables of this bridge passed over wooden supports on each bank. These supports had every appearance of strength. One day, out of curiosity, a man climbed to their top and found them completely honeycombed by Termites. Quick repair work was done and a new lesson learned of the destructive agencies always at work in the tropics.

It may cause some surprise, while seated at a satisfactory spread in one of the best hotels in the Zone, to have a large, shiny, black ant appear over the side of the table and pass out of view among the dishes placed thereon. But this is not an unusual experience.

Ants are the only pests over which Canal authorities have not gained control. Although they have been reduced materially in number, they have not been eliminated and you will find them in most unexpected places.

EARTHQUAKES.

While the instruments for earthquake observations, located at Ancon, show numerous indications of earth disturbances, so do those at all points where such instruments are located; and, while the Central American states are subject to unusual disturbances, yet it is a fact that no shock of magnitude has ever occurred in the Canal district. The ruins of old buildings in the City of Panama are pointed to as proof of this fact.

It is well known that concrete resists earthquake shocks better than any other known building material. Consequently, it is believed there is little danger to the locks of the Canal from this source.

CANAL EFFECT ON THE FISH.

The United States Government completed a faunal survey of the Isthmian waters as early as 1911. It is proposed to make a second survey in five or ten years to ascertain the result of the intermixing of species of the fish of the two oceans.

SPEED LAW OF THE PANAMA CANAL ZONE.

Automobiles, motor cycles, bicycles, etc., must not exceed fifteen miles per hour on straight track, nor eight miles per hour when approaching or traversing curves, cross-roads, or streets of cities, towns or villages of the Canal Zone.

Law of the Road.

Meet and pass on left. Overtake and pass on right.

WIRELESS STATIONS.

All wireless stations in the Canal Zone are in charge of the Navy Department of the United States government, and are available for private and commercial business.

A high-power station is located near Caimeto Junction, capable of communicating with points 3,000 miles distant. Stations of less power are also located at Porto Bello and Colon on the Atlantic Coast, and at Balboa on the Pacific side.

The United States government has made arrangements for high-power wireless stations to be constructed on the California Coast, on the Hawaiian Islands, in American Samoa, Guam, and in the Philippines, thereby enabling that government to be in constant communication with a territory embracing a distance which equals more than one-half of the circumference of the globe.

UNOFFICIAL WEATHER BUREAU.

Obtain a private weather prognosticator. That can be done by securing a piece of seaweed. Take it home with you and suspend it out of doors or away from artificial heat. If the weed continues dry and crisp, fine weather will continue. If the weed becomes flabby and moist, rain is likely.

MILITARY DEFENSE OF THE ZONE.

The Panama Canal Zone seems to be formed for natural defense. The locks, which are the vulnerable portion of the Canal, are located eight miles from deep water. The high lands of the Isthmus, as well as the islands of Panama Bay, all seem to be placed there as assistance in the general plans of defense, for no battleship could survive the land batteries long enough to succeed in doing damage to the locks.

The Atlantic entrance can also be easily defended by shore batteries, having heavy guns in their emplacements, while the good roads of the Zone will admit of the rapid movement of troops to threatened locations in case of necessity in any emergency.

A foe would hesitate before attempting to approach the Canal overland, for the dense jungle, the bottomless swamps,

the rough topography, the heavy rains, and the humid atmosphere have been the cause of many failures on the part of military expeditions in the past and will so continue in the future if, unfortunately, any such occasion arises.

MONROE DOCTRINE.

Message of James Monroe to Congress, December 2, 1823.

“With the existing colonies or dependencies (on this hemisphere) of any European power we have not interfered and will not interfere. But with the governments who have declared their independence and maintained it, and whose independence we have, on great consideration, and on just principles, acknowledged, we could not view any interposition for the purpose of oppressing them or controlling, in any other manner, their destiny, by any European power, in any other light than as the manifestation of an unfriendly disposition toward the United States.”

SHORT EXCURSIONS FROM POINTS ON THE CANAL ZONE.

From Colon

to Porto Bello. (See page 65.)

Mouth of Chagres River.

Mt. Hope Cemetery. (See page 64.)

From Gatun

to Mouth of Chagres River. (See page 80.)

Islands in Gatun Lake.

From Gorgona

to Balboa Hill. (See page 76.)

From Gamboa

to Las Cruces. (See page 82.)

Chilibrillo River Caverns. (See page 83.)

up Chagres River (for alligators).

From Empire

to Camacha Dam and Water Reservation. (See page 79.)

Las Cascades Cocoa and Rubber Plantation. (Page 79.)

From Las Cruces

over “Royal Road to Panama.” (See page 82.)

From Panama City

to Ancon Hill. (See page 82.)

Old City of Panama. (See page 90.)

Taboga Island. (See pages 83, 112.)

Pearl Islands. (See page 112.)

Balboa—Pacific entrance to canal. (See page 43.)

Sea Beach. (See page 93.)

Ancon Hospital Botanical Gardens. (See page 76.)

A CAUTION TO EXCURSIONISTS.

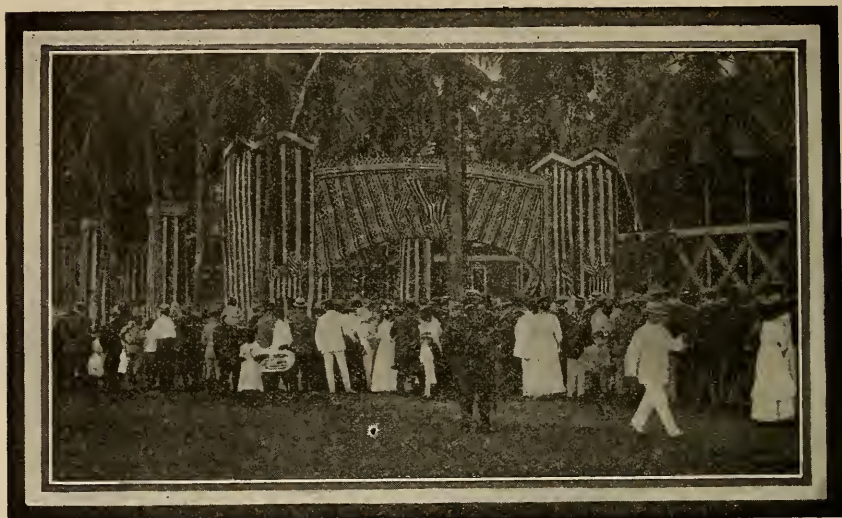
At the risk of seeming to over-state what the author feels is a most important warning, the stranger in this strange jumble of land and water is surrounded by teeming life, both vegetable and animal, and in all their turmoil for existence, if he has no guide, either in person or in this attempted warning, he may easily have undesirable experiences. Minute insect pests are found on the vegetation that will fasten themselves to the traveler much to his discomfort. Small wasps may have their nests disturbed and their activity is in reverse proportion to their size.

Snakes may be found at any time or location, and they are of all sizes, either in length or circumference, from the coral snake, so-called from its red color—a small and dangerously poisonous snake—to the snake that will require two or three men to hold it up for a photograph.

A nettle may be met with, called the "cow nettle," that stings the human flesh to an exasperating degree.

And last, but by no means least, is the uncertain footing of the trail. During a recent tramp, desiring to shorten by a couple of steps the distance, the author stepped from the regular trail onto what was dry and hard-baked ground at the side of the path. His first step took his foot into the soft mud underneath the crust, and as he quickly placed his second foot alongside the first to help gain his perpendicular, it followed the course of the other downward, and he found himself half sunk into the black mud and slime. By getting a quick grip on a large rock at the side of the path he stopped his descent and was able to regain the original path with the help of a passing Jamaican negro, who raised his respect for the mud of the Isthmus still further by saying: "I tell you, boss, you was lucky. You might have gone in over your head." Also, to show the uncertainties of the trail from above, as well as from below, one more experience might well be related. Having gone along the trail leading to Balboa Hill in the morning, we were returning in the afternoon, when a large object was seen in the path ahead. Using care in approach, since neither had a better weapon of defense than the umbrella, it was found the object was a full-grown sloth. The guide, after a short inspection, said it had probably been caught in the tree-tops by some "mountain cat," its throat cut (he showed me the wound), its blood sucked and its body then allowed to drop to the ground. By way of parenthesis it might be said the claws of the sloth made very desirable mementoes. Since it lives in the tree-top all its life, is as large as a full-grown dog, and hangs below from the branches, its toenails are from one to two inches long and sharp.

All these experiences, and others that might be related, will begin to give the reader a few ideas as to the need of caution and a guide while wandering in strange places.



Fourth of July Celebration at Cristobal.

ANCON HOSPITAL BOTANICAL GARDENS.

Persons interested in the vegetation of the tropics will find much to interest them in the Ancon Hospital Gardens. There have been collected specimens of not only the usual trees, plants, shrubs, fruits, nuts and roots, but also unusual specimens not generally found in botanical gardens.

BALBOA HILL.

Balboa Hill is the highest point in the Canal Zone. Its elevation is not great, but the rough and winding trail, closely encompassed by the jungle, the grade—steep in places—and the humid atmosphere, all assist in making its ascent quite a task.

The trail starts from Gorgona. One can use the native pony or go on foot. In either case, prepare for mud and water. During the dry season it is little more than the bed of a “wash”—wet, muddy and slippery. During the rainy season the trail is likely to be a torrent.

The distance is called five miles. One who has plenty of strength and is accustomed to exercise can reach the top of the hill in an hour and a half.

When Balboa was on his mission of discoveries, he was told by his guides of a great water lying to the south that could be seen from a certain peak. After encountering many difficulties, hostile Indians and a more hostile jungle, with its close growth and swamps and rough hills, he was able to reach the summit. It is said in order to obtain the honor for himself only, he

BALBOA HILL—(Cont'd).

ordered his men to remain in the rear and he advanced for the first view alone.

The summit of the hill is crowned by one of the surveying platforms which the engineers have placed on each of the prominent hills for markers. This platform is probably thirty feet high.

If the sky is free from clouds, the Pacific Ocean can be seen in the southeast at two points, one on each side of Ancon Hill, about eighteen miles away. One can look to the right of Ancon Hill, to the coast and out over Panama Bay and see the Islands, truly a beautiful sight. To the left of Ancon Hill can be seen a part of Panama City, and this view extends on out to where the vessels ride at anchor.

The Atlantic coast is probably thirty miles away, but one can see Colon harbor and watch the ships passing in and out. If the air is unusually clear, quite a length of coast line is visible. But it should be remembered that clear weather on each coast is necessary, and he is lucky who is successful in the choice of the day for his view.

The trip is worth while for many things besides the view. The experience in the jungle, with its varied vegetation, birds, and possibly animals, will interest the observer.

The native, in traveling the trail, whistles before passing around a bend "to scare snakes and other varments out of the path." On all sides are tall trees hidden by dense growth of vines. Your guide will call these "Snake Trees" and will probably tell you how snakes crawl into these vine-covered trees to sleep in the comparatively cooler location. If snakes dwell in the mind, probably one soon cannot tell the difference between vines and snakes.

The trail of the black ants, broad, hard highways, will cross the path. Along one side of this trail will be a continuous procession of pieces of leaves. Examine and you will see the body of the ant laborer carrying off the "greens" for future food. On the other side of the highway, as big and as rapidly traveling, is a procession of big black fellows returning for another load. This path can be traced for a long distance on each side of the trail, and if the two trails are compared the hard packed one traveled by the ant will be looked upon with envy by the explorer who is laboring along through the muck and wash of the so-called trail of civilization.

A dissertation on the surroundings of this trail could include all there is to tell of the natural life of the Zone. If you make the trip, keep your eyes and your brain busy and you will return well satisfied that you made the excursion and will be fully ready to advise others not to undertake its difficulties.



Triangulation Tower on Balboa Hill.

(From this platform, a view of both the Atlantic and Pacific Oceans may be had.)

CAMACHA DAM AND RESERVOIR.

Camacha Dam and Reservoir are located one and one-half miles south of Empire.

They are easily reached from that point, and will well repay persons who care to walk that distance.

They are connected with Empire by a narrow-gauge railroad. One who walks along the path between the rails is hedged in by the jungles, and can study nature at close range and from a secure footing.

The reservation is in charge of a superintendent, who has a home and its contents furnished him by the Commission.

The view at the lake is worth the small effort needed to take one to that point.

This trip can be made in half a day, altho an entire day might be fully occupied, and profitably and pleasantly employed. The trip is one which commends itself to the careful consideration of the younger students of natural history, and can be safely undertaken by family parties, without any excessive fatigue or the expenditure of more than ordinary effort.

CAUTION.—No trip away from the beaten thoroughfares of the cities and into the surrounding country should be taken unless accompanied by some one well informed as to local conditions.

LAS CASCADES COCOA AND RUBBER PLANTATION.

A good road, very attractive for a driver, a horseback rider, or even a good walker, leads to this plantation. It is located five miles up the Las Cascades valley, across the Canal from Empire in a northeasterly direction.

This plantation, containing one hundred thousand acres, was located here by an English company, who built and furnished a fine manorial establishment for its superintendent and for the entertainment of its guests. But differences among its stockholders caused the management to become lax, and the plantation fell into bad repair, the cocoa pods falling to the ground and wasting, and the rubber trees receiving no attention. It has been planned to repair the damages and put the property on a paying basis.

Strange birds and flowers and plant-life surround you.

Along the road to the plantation, one has an opportunity to study the vegetation of the Zone, from the delicate, sensitive plant that spreads over the earth and curls up at even the approach of a cane or umbrella, to the tall, straight cotton trees that are used for cayucas, or native dugout boats.

You may meet the charcoal burner, who camps on the hillside where the hard wood grows and who burns it under damp-

ened earth, and sells the charcoal to the housekeepers in the Canal Zone for cooking purposes. He lives in the open, directly exposed to sun and rain, and knows nothing of cleanliness nor sanitation. He drinks at any stream and wonders why the white man will not do the same. He seems to be immune from all troubles and probably will remain so unless civilization overtakes him and forces him to take a bath.

THE MOUTH OF THE CHAGRES RIVER.

If you wish to get close to nature's heart, as exemplified by this section of old mother earth, go to Gatun; get a native boatman, choosing boat and boatman for the occasion and taking every precaution for safety in boat and boat power. Drop down the river with such speed—or lack of it—as you desire, to its mouth, a distance in a straight line of eight miles, which you will probably find more than doubled by the curves and bends. Here you can not only knock at nature's door but can even enter and make yourself at home. The river is sluggish in its current, as the fall is only ten feet to the Caribbean's shore, and there should be very little more labor returning against its current than in floating with it.

On this trip you will see the animal and vegetable life of the tropics at first hand. Along the line of the Canal, the monkeys, deer and other wild animals have been frightened away by the advent of man and his explosives. Not so by this river route. Here you carry civilization with you in your boat; you'll find none along the route. Where the river in years ante-dating the railroad was alive with the passage of boats from Ft. Lorenzo to the point where the trail left the river for Panama City, now no one is seen unless it possibly be a stray boatman like yourself on a trip of exploration.

Here will be strange sights and sounds worthy a live person's attention. But listen to a word of caution: decide to take this trip on your own responsibility, and hold this book in no way liable for results. Wild animals, and snakes, and strange birds, and insects, and vegetation, and swamps, and snags, and alligators, etc., may be pleasant to read about, but not so pleasant in the experience. Do not go on this line of exploitation without counting the possible cost. Then if you decide in the affirmative, here is hoping you have complete success in the experience, and are ready to declare on your return how glad you are that you went, but that you wouldn't recommend the trip to anyone else.

THE TRAIL OF THE GOLD HUNTERS.

Upon the discovery of gold in California in 1849, the route of many gold hunters to the new Eldorado was by water to the

THE TRAIL OF THE GOLD HUNTERS—(Cont'd).

Isthmus of Panama, across the Isthmus and up the Pacific coast to San Francisco.

Before the old city of Panama was destroyed by Morgan and his buccaneers, the road across the Isthmus was from Porto Bello—some twenty miles east of the present city of Colon—by water to the mouth of the Chagres River, thence up that river by boat to the town of Las Cruces. This town was located two miles up the Chagres River beyond where the Canal leaves that river and enters Culebra Cut. From Las Cruces to the old city of Panama was the highway known as "The Royal Road to Panama." (See page 82.)

In 1849, the town of Aspinwall was located where the present town of Colon now is and Porto Bello thereafter steadily lost importance as a sea-port. Aspinwall was the Atlantic sea-port used by the gold hunters and was the point from which the Panama railroad extended toward the Pacific. Before the railroad was completed, transportation was by means of boat from Aspinwall along the coast northward to the mouth of the Chagres River. Small boats were used to ascend the windings of that stream up to and through the Gatun hills and over the Black Swamp to the old Spanish town of Las Cruces. The river boats used on the Chagres were broad and flat bottomed and were poled up the river by naked natives. The further distance of eighteen miles by road over the Continental Divide brought the traveler to the city of Panama. One method of transportation over this trail for women and children was to ride in a chair strapped on the back of some stalwart native. Having reached Panama City, days, and at times weeks, of uncertainty were spent before passage could be secured for San Francisco.

When one remembers the old time sailing vessel on the Atlantic crowded to its limits, the men, women and children that were forced to camp on deck because of inadequate facilities, the hard and dangerous river route of the Chagres with its accompaniment of swamps, jungles, pestiferous insects, heat and flood, the land journey to Panama City, another crowded vessel on the Pacific, with its long and uncertain voyage,—then one has brought to mind more strongly than ever before what the "lure of the gold" means.

One must also remember that aside from the usual dangers and privations, the Gulf of Panama is most uncertain for sailing vessels. This ocean is well named "the Pacific," for during long periods of time, there are calms during which a sailing-vessel can make no headway. It is recorded that Pizarro at one time lost seventy days in beating around the gulf in his boat trying to get out into the ocean and then, becoming discouraged, returned to Panama. The pilot books instruct the navigator who depends on

THE TRAIL OF THE GOLD HUNTERS—(Cont'd).

sails to make his best efforts to go south if he would go north, for he must sail south across the "Line," as the equator is called by sailors, and then proceed west along the course of prevailing winds into the ocean, before he can turn the prow of his ship northward with any assurance of success. The commanders of steamships are recommended, as far as possible, to take the shore route, thereby receiving an advantage of two or three knots per hour from the assistance of prevailing sea currents.

Since steam has become the motive power, the troubles of the navigator have been reduced. A steamship can proceed where it will. All difficulties have given away before the steady advance of science and perseverance and the traveler can now settle himself aboard his ship, among all the comforts of home. He can sail from his home port over the seas, through the land and over the seas again, and know little of, and probably care much less for, the dangers and discomforts of the pioneers who "blazed the way."

CRUCES TRAIL.

(The Royal Road from Cruces to Panama City.)

Las Cruces is a small town located on the Chagres River two miles northeast of the crossing of the railroad.

The "Royal Road to Panama" left the river at that point going overland to the last named city. It is probable that this trail was used as early as 1530, and was in general use by 1537.

This is possibly the oldest road in America. It was paved with rock but contained no bridges.

This was the route over which all the treasure from Panama was brought on its way for trans-shipment to Spain at Porto Bello.

When the treasure fleets ceased to call at Porto Bello in 1738, this trail was abandoned. It was revived during the gold excitement of California.

Having since been rebuilt by the government, one may now ride over the same trail, but be sure to obtain a guide who is familiar with its conditions and also have the guide vouched for by some one of reliability.

ANCON HILL.

To a reasonably sturdy person the ascent of this hill will be a pleasure, both because of the exercise and of the view from the summit of the hill.

The path leads up from the Panama City side, on past the water reservoir to the summit; and half a day will serve your

ANCON HILL—(Cont'd).

purpose. Take your field glasses. From the top the view includes the Bay of Panama with all its many islands—their beauty heightened by the romance of their history. From the extreme east, the coast can be traced from beyond the ruins of old Panama City back past them, to and around the new city, past the base of the hill on which you stand to the entrance of the Canal, and along the coast until it disappears in the hazy western distance. The course of the Canal across the Isthmus can be followed by the eye from the Pacific ocean to the Miraflores locks and the mountains at Culebra can be seen. With the help of the map, on page 24, one can locate and name many of the peaks of the Zone.

The immense quarries of Ancon Hill supplied the rock for the concrete of the locks at this end of the Canal. The top of the hill is surmounted by the usual signal flag of the surveyors.

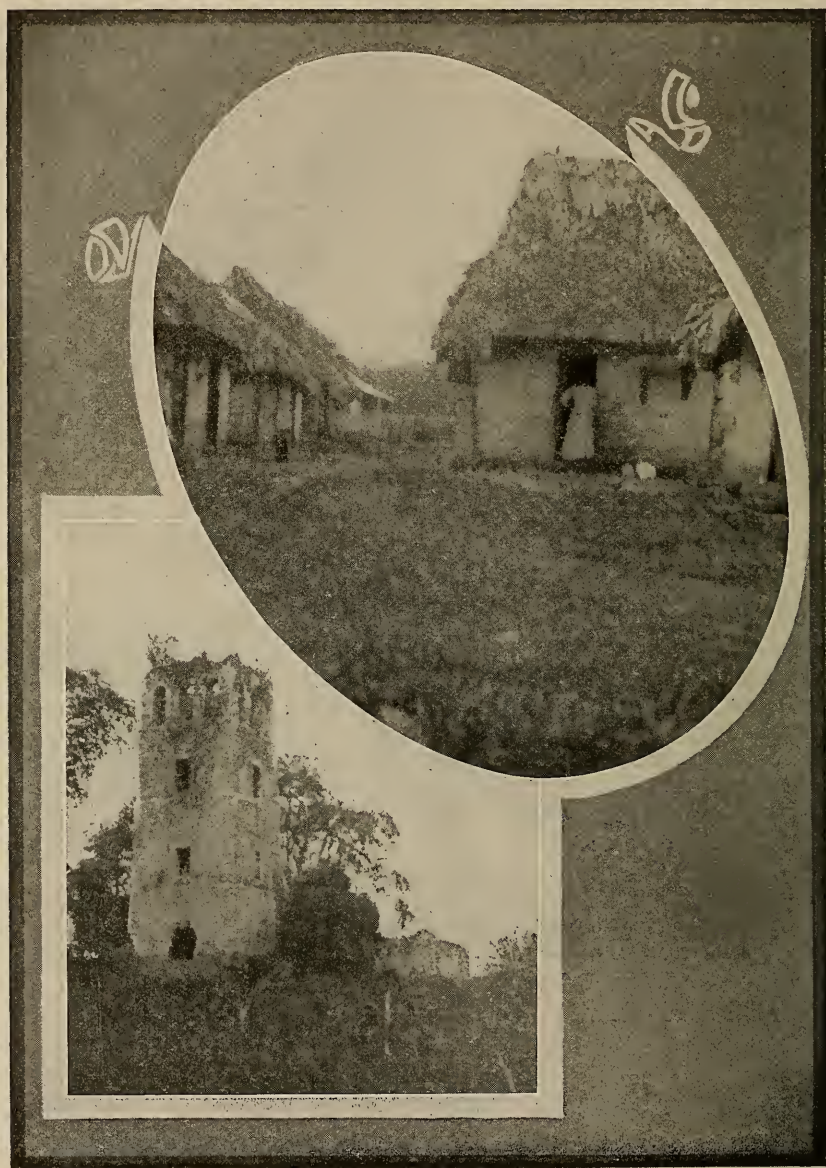
Ancon Hill takes part in the general plan for the fortification of the Pacific entrance to the Canal. Large guns are placed here, and it is the purpose of the government to make this hill practically impregnable.

TABOGA ISLAND.

What by many is considered the most pleasant excursion on the Canal Zone is the trip to Taboga Island. This island is located nine miles south of the city. Its highest elevation is 935 feet. It is well cultivated and has a large village on its northeast side. The pineapples grown on this island have more than local fame. The Canal Commission has a large sanitarium here and the climate and pleasant surroundings all combine to add to its attractiveness.

CHILIBRILLO RIVER CAVERNS.

Extensive limestone caverns have been found near the Chagres River about two miles east of the Canal Zone boundary line.



(1) Street in a Native Village.
(2) Ruins at Old Panama City.

(C)

FACTS CONCERNING THE REPUBLIC OF PANAMA.

Panama (Indian, "abounding in fish").

Located between 7° and 9° 50' north latitude, and between 77° and 83° west longitude.

Four hundred and twenty-five miles long.

Seventy miles wide.

Declared independence from Spain in 1821.

Joined the republic of Granada shortly afterwards.

Republic of Granada became republic of Colombia.

Withdrew from Colombia and joined New Granada.

Became part of the United States of Colombia in 1863.

Declared independence November 3, 1903.

* * * * *

To understand the status of the republic of Panama, subsequent to the time when it was a part of the United States of Colombia, a short resume of its political history is appropriate.

As in all important subjects, in this there are wide differences of opinion among the interested parties.

Previous to 1903, the state of Panama was a part of the United States of Colombia. On that date the inhabitants of Panama declared their independence. Colombia sent its troops to attempt to subjugate the revolvers, but for various reasons were not successful. In the meantime, a republic was declared and Panama took her place among the nations of the earth and began to do business.

The Colombian government holds that she has claims against Panama and that she should have them recognized. The treaty between the United States of America and Panama provides that the United States shall protect Panama against invasion, —consequently, Colombia has her claim.

The claim on the Panaman side of the controversy is that Panama was an individual country temporarily in the federation of the United States of Colombia and that when it desired to retire from that partnership, it had that right.

The United States of America seems to take the stand that, while she has nothing to do with the controversy, she does have the right, and it is her duty, to keep the right-of-way of the Canal open.

Naturally, with the United States of America between the contestants, there can not be much of a fight.

The republic of Panama saw no reason for assuming any portion of the United States of Colombia's national debt. Therefore it entered the house of nations debt-free.

The money received from the United States of America for the Canal concession is invested in New York real estate.

Panama will also receive \$250,000 per year from the United States of America, beginning nine years after the sale of the concession, as per the terms of their treaty. This payment continues to perpetuity. So it would seem that the republic of Panama need never fear poverty.

The elections are fair to all political parties, because supervised when necessary by the United States of America.

The principal cities are: Panama City, the capital,—Colon, second city in size,—and David City.

VEGETATION.

No extended study of the vegetation of the Isthmus had been made up to the time of arrival of the United States interests. All the products of the tropical zone are possible. The surface of the Republic is as varied as the larger sections of any country, consisting of mountain chains, and valleys, and level lands called "savannahs" (meadows). It is rich in natural resources, and with capital and brains much could be accomplished.

A partial list of possibilities in vegetation would include: Pineapples, Cocoa, Rubber, Coffee, Cocoanuts, Citrus fruits, Vanilla, Sarsaparilla, Indigo, Plantain, Bamboo, Guava, Mango, Pawpaw, Bananas (yellow and red), Alligator Pears, Oranges (sweet and sour), Pipeas, Soursap, Avacadoes, Chaijotes, Indian Corn, Cassava, Yams, Tobacco, Sugar Cane, Rice, Breadfruit, Brazil Nuts, Ivory Nuts. Among the trees are the Mahogany, Cabinet woods, Cocobolo, Lignum vitae, Cork wood, Dye woods, Calabash. Flowers are of brilliant colors and little odor. Few have been classified. A nettle called "cow nettle" that stings the flesh in a very exasperating, though not a dangerous, manner is found in the jungle.

Orchids.

Thousands of species of orchids are found all through the jungle. The following is but a short list of those which can be seen in a day's stroll: Noah's Ark, Sacred Orchid, Sampson's Needle, Honey Bee, Dragon Fly, Forest Queen, Bride of Christ, Annunciation, Tears of the Virgin, Seventh Besetting Sin.

MANGROVES.

A small tree that fringes the semi-salt shores of tropical countries. Branches are sent out from the parent stem and the other branches, and curve to the ground and take root, continuing this method *ad infinitum*.

AGRICULTURE.

The general custom in Panama for those desiring to farm has been to take possession of the land and clear it and begin to

cultivate. The method was very primitive. The "farmer" would scratch the surface with a machete or stick and plant corn, yams, cassava, plantains, bananas, and other fruits and vegetables.

In the Canal Zone, during the construction of the Canal, many laborers "took to the brush." This was not encouraged by the Zone government, and it will probably take possession of the complete Zone, possibly letting it in the main relapse again into jungle since that, in a way, is a good defense against outside military operations.

INHABITANTS.

As in all Central America, caste governs society. The educated and cultured and wealthy govern the poor and ignorant.

The natives are as much of a mixture of all shades of color and line of descent as is possible, and are poor, ignorant and of little consequence except as laborers. Their stature is short, the average height being at least a foot shorter than among the inhabitants of the temperate zones.

They are normally care-free and happy, and holidays and evenings are given over to social interchanges. Music is a part of their life. They have their national theaters and bands and the Sunday evening concert in the city plaza or park is the society event of the week. They are inveterate gamblers and they will spend their all for a lottery ticket or wager it on their favorite in a cock fight.

Many of the old Spanish families are of the purest Castilian descent and have held the strain unalloyed through all the years.

HUNTING.

There is good sport on the Isthmus, although probably of unusual character. If desiring to engage in this pastime, first prepare yourself by engaging a reliable guide, and acquaint yourself with the laws of the Isthmus concerning firearms.

Alligator hunting is a favorite pastime, notwithstanding the fact that thousands of alligators, as well as other game, have been forced away from localities near the Canal by explosives used in its construction. There are men on the Zone who make a specialty of alligator hunting.

A drop down the Chagres in one of the cayucas or native boats from Catun toward the river's mouth, or up from Las Cruces, or along the coast and up any of the other rivers, will be pretty sure to furnish you with good hunting.

The deer and hogs are small in size in the tropics, but other animals are larger. Tapirs weighing more than one thousand pounds have been killed, and snakes grow large and are of great length,



Alligator Hunting on the Chepo River. (1) Landing the Game.
(2) Counting the Spoils. (3) Beheading the 'Gators.

HUNTING—(Cont'd).

Of all the sports of the Isthmus none will give the man with the full-grown desire for game in his system more satisfaction than alligator hunting. While alligators and crocodiles are found in abundance in all Panaman streams, yet the easiest and most satisfactory way will probably be to start from Panama City, going along the coast by launch ten or twenty miles, then entering some river, where the desired game will be found. Any good shooting gun will do, but a soft-nosed bullet is almost a necessity. The small, steel-coated bullet will enter the game and pass through and come out beyond, doing little damage, while the soft-nosed bullet works differently. It enters and then seems to cause an explosion of its own inside the brute, which results in the death of the animal.

The accompanying pictures will show the success of a recent hunting trip. The party left Panama City in a launch at night, arriving in the Chepo River and going on to Alligator Creek, one of its affluents. The arrival was made by early day-break, and the sport began at once. Members of the hunting party wallowed ashore through mud hip-deep, while others remained in the launch.

A small, black object would be discovered floating along on the surface of the water. A bullet placed in it would cause a turmoil in the black, muddy water, resulting in a rope being thrown over the subsequently quiet body and the 'gator would be pulled ashore. Their teeth make desirable mementoes. (In the picture note the dead parrot placed on the alligator's nose.)

PANAMA HATS.

The so-called Panama hat is made from the fibre of the bamboo. The seat of its manufacture is in Ecuador, and it gets its name from Panama City, that being its original port of export.

Good Panama hats are almost as expensive on the Isthmus as in Northern localities. While hats can be purchased for as little as \$5.00 or \$10.00 gold, the native Spaniard will hardly consider one that is purchased at a less expense than \$25.00 or \$50.00 gold.

CHIRIQUI HATS.

The Chiriqui (pronounced "Cherokee" in English) hat is the original, bona fide, simon pure, Panama hat, since it is made by the Chiriqui Indians of the province of Chiriqui, in the western part of the republic of Panama.

The Chiriqui hat is also made from the fibre of the bamboo, but the fibre is coarser. This hat usually has black bands woven in it. If woven by an Indian maiden, the circle formed by the bands is left incomplete, thereby proclaiming her state of single blessedness. If woven by a married woman, the circle is finished—an indication that her connubial bliss is, or should be, complete.

Chiriqui hats are worn by many of the watermen along the coast. They are light and cool; and can be gotten for one or two dollars, gold, and make a very satisfactory and useful souvenir.

OLD PANAMA CITY AND ITS DESTRUCTION.

The ruins of old Panama City lie just outside of the Canal Zone on the coast northeast of the present modern city, and may be seen from the sea front. A trip to its location will be interesting—it can be made easily under the care of a competent guide.

The old city of Panama was founded about the year 1520 and was destroyed in 1671 by Morgan and his buccaneers. At the time of its destruction it was a city of some 30,000 inhabitants, important and wealthy. It was a great depot for gold and silver from Peru. It had eight monasteries, a cathedral, churches, hospital, two hundred richly furnished houses and several thousand lesser homes. It had a chamber of commerce and its business occupied two hundred warehouses.

After three weeks of rapine by Morgan and his men, the remains of the city were burned. [See page 60.]

After its destruction the new city was built by the survivors, six miles west, on a peninsula, as an added safeguard against a repetition of their misfortune.

Points of Interest in and Around Panama City.

Cathedral Plaza, between Fifth and Sixth Streets on Central Avenue.

Bolivar Plaza, between Third and Fourth Streets on Avenue B.

National Square at the extreme point of the peninsula at east end of Avenue A. The prison is located here and an antiquated cannon points out over the bay.

National Palace and Theater, at Third and Central Avenue. Market, at Eleventh Street and Central Avenue.

Herrera Plaza, at Avenue A and South Ninth Street.

Plaza, at Twelfth Street and Central Avenue.

Old steamboat wharf, at the Market, from where the '49ers took ship for California.

Points of Interest In and Around Panama City—(Cont'd).

A walk around the sea wall will not be amiss, and will be found to be very interesting.

Visit the Cathedral at Seventh and Central. It was founded in 1760 and has the highest spire in Central America. This spire was used by the surveyors as one of the primary points, in conjunction with the lighthouse at Colon and the summit of Balboa Hill, in establishing the line of the Canal.

De Lesseps' headquarters, later the old Panama Lottery headquarters, facing the Plaza.

Visit the Chinese gardens on the low ground west of the city.

Cemeteries on East Balboa Road.

Climb Ancon Hill. (See page 82.)

Go to the old city of Panama. (See page 90.)

View the Savannahs (level meadows), a short distance in the country.

Spend a half day "on the Beach at Panama." (See page 93.)

If possible, spend a Sunday evening in the Plaza listening to the National band concert and watching the "milling" of the audience.

The oldest church in Panama is San Felipe Neri, founded in 1688.

The ruins of the church of St. Dominic contain the famous flat arch, a single span of sixty feet, almost horizontal. Legend says it was successfully placed by a miracle after several failures. The fact that it is yet standing after so many years is pointed to as proof of the absence of severe earthquake shocks in this locality.

THE MODERN PANAMA CITY.

After the destruction of the old city of Panama by Morgan and his men [see page 60], those left of the occupants located their new town on a small peninsula six or eight miles west. This peninsula was well protected on the three sea sides of its rocky shore, upon which the inhabitants built a sea wall, which still remains, while across the land side was built a rampart forty feet high and sixty feet broad, which has since fallen into ruins. The new city in time filled the available ground and was forced onto the level country beyond.

At the present time Panama City contains some 35,000 inhabitants. It is the capital of the republic of Panama, and is the seat of the culture and refinement of the Republic, as well as its political capital.

THE MODERN PANAMA CITY—(Cont'd).

The houses are of stucco, decorated with water paint of different bright colors; they are two or three stories in height and built so near the street line that there is scarcely room on the sidewalk for two persons to pass, while above the walks are the overhanging balconies from which, owing to the narrow streets, it seems almost possible to shake hands with one's neighbor across the way.

The principal street is Central Avenue and it runs from the depot through the length of the whole city to the east sea wall. Two other streets, Avenue A on the south and Avenue B on the north, run parallel to Central Avenue. The cross, or north and south streets, are numbered streets, beginning with First Street at the east sea wall.

If you desire, take a carriage; first making a contract either by the hour or as to the locality. Try to get an English-speaking driver, thereby gaining a guide, as well as obtaining a carriage. A pleasant drive can be made from Panama City, passing to the right of Ancon Hill and driving to the Pacific entrance of the Canal at Balboa—returning by the road that passes between the Hill and the beach. En route, notice the Chinese gardeners in their native costumes, their heads crowned by enormous sunshade hats, working in their truck patches. One can almost imagine himself passing along one of the highways of the Celestial Kingdom. After leaving Ancon Hill the road passes between the two old cemeteries. A visit to these burial places will be interesting.

Distances in Panama City are not long and the street car may possibly answer every purpose, but remember in all bargaining, whether for a carriage or in the purchase of merchandise, to have it specified whether payment is intended to be in "gold" or "silver," as their ratio is two to one. Coach fares are posted in the carriage and almost any locality in the city's boundary may be reached for one fare—ten cents gold or twenty cents silver. Remember that a stop to shop or snap a kodak may cause the driver to consider the remainder of the ride a new trip, thereby adding to your expense. It is policy to avoid all strong differences of opinion in your transactions with the inhabitants, as the Panaman courts of justice seem at times to be easily entered and the result is not always pleasant to the sojourner within the gates.

Panama City probably presents the best place on earth to study international life, for at this point all streams of travel converge.

Panama City is unfortunate in her sea front from the viewpoint of wharfage facilities for large vessels. The extreme tide leaves the rocky bed of the harbor exposed during its ebb, al-

though allowing vessels of small draft to approach quite close to shore during high tide. All large vessels are compelled to anchor out in the harbor and conduct their shore communication by means of small boats.

The Panaman Government has appropriated a large sum of money to be expended in improving their harbor facilities.

* * * * *



View of Panama Bay.

—o—

On the Beach at Panama.

One of the most pleasant little excursions can be made on foot from Panama City, going out past the depot and turning to the right to the beach and walking along it at your pleasure. The street railway traverses Central Avenue out past the Panama Railroad depot. Get off at any road leading toward the beach. This is an ideal excursion for families, and, by taking lunch along, the entire day may be spent on the beach.

The extreme tides of Panama Bay (over twenty feet), the sandy, shell-covered beach, the historical Panama Bay in the foreground, Panama City on the right, the ruins of old Panama City on the left, and the hills in the background, produce a pleasing panorama, and the traveler who visits this spot will carry away with him a picture which will remain long after many other scenes have faded from the memory.

Standing on the beach a panoramic view of this historical spot is before the observer. Out in the bay may be seen the islands which form a part of the natural protection of the harbor; to the right, on a peninsula extending into the bay, the modern Panama City spreads out before you, and beyond may be seen Ancon Hill. On the left the beach swings until it is beyond range of vision.



Typical Bachelor Quarters—Canal Zone.

TABLE OF DISTANCES FROM PANAMA CITY.

City	Country	Miles
To Punta Arenas.....	Costa Rica.....	456
San Juan del Sur.....	Nicaragua.....	612
Corinto.....	Nicaragua.....	718
Amapala.....	Honduras.....	781
La Union.....	San Salvador.....	802
La Libertad.....	San Salvador.....	906
Acajutla.....	San Salvador.....	944
San Jose.....	Guatemala.....	1,004
Champerico.....	Guatemala.....	1,080
Ocos.....	Guatemala.....	1,100
San Benito.....	Mexico.....	1,123
Salina Cruz.....	Mexico.....	1,305
Acapulo.....	Mexico.....	1,593
Manzanillo.....	Mexico.....	1,744
San Blas.....	Mexico.....	1,910
Mazatlan.....	Mexico.....	2,035
San Francisco.....	United States.....	3,480
Punta Arenas.....	Strait of Magellan.....	3,750

TABLE OF DISTANCES FROM COLON.

To New York.....	United States.....	1,917
Punta Arenas.....	Strait of Magellan.....	6,729
Panama City.....	Via Panama Canal.....	55
Panama City.....	Via Strait of Magellan.....	10,500

MILES SAVED BY PANAMA CANAL.

From United States Atlantic sea-board to United States Pacific sea-board.....	8,400
Europe to United States Pacific sea-board.....	6,000
United States Atlantic sea-board to South American Pacific sea-board.....	5,000
Europe to South American Pacific sea-board.....	2,500
New York to Japan.....	3,250
New York to Australia.....	3,800
New York to China.....	1,600
New York to New Zealand.....	2,500
Europe to New Zealand.....	1,600
England to Australia.....	800

UNCIVILIZED TRIBES.

In spite of the many surprises with which the tourist is constantly confronted in the territory surrounding the Canal Zone, one would doubtless be amazed to find a race of people living in a primitive way.

PART III.

FROM PANAMA CITY
TO SAN FRANCISCO.

(A Guide to the Pacific Coast.)

- (A) MARINE INFORMATION.
- (B) PACIFIC COAST COUNTRIES
OF CENTRAL AND NORTH
AMERICA.



AS THE SHIPS PASS IN THE NIGHT.

Different colored lights are carried in the three principal parts of a ship to identify locations. Green and red lights are carried on the starboard and port sides respectively. They are placed outside the ship at the height of the upper deck so that they will show both fore and aft. The white light is a mast-head light.

The rules under which the crew of a vessel operate are summed up in the verses, printed for your convenience, below.

If to my Starboard Red appear,
It is my duty to keep clear,
To act as judgment says is proper,
To Port, or Starboard, Back, or Stop her.

But when upon my Port is seen
A steamer's Starboard light of Green,
There's naught for me to do but see
That Green to Port keeps clear of me.

But in safety and in doubt,
I always keep a good lookout.
In danger, with no room to turn,
I ease her, Stop her, Go astern.

When all three lights I see ahead,
I Port my helm, and show my Red.
Green to Green, or Red to Red,
Perfect safety—Go ahead.

(A)

OCEAN ROUTES FROM PANAMA TO SAN FRANCISCO.

Between the ports of Panama and San Francisco, there is a choice of two routes:

(1) The all-sea route, in which the ship goes to sea and makes no intermediate stops.

(2) The local passenger and freight carrying steamer, making regular ports en route.

The Open Sea Route.

On leaving Panama the steamer traveling this route passes to the open sea, only approaching the shore at points along the route of near approach to land. This route contains all the usual elements of a sea voyage, where the passenger may enter into the daily maritime life, going to bed and getting up by the sound of the ship's bell. If saving of time enters into the passenger's consideration, this route will appeal to his desires, for the time is about one-third that of the local or coast-wise route. Ten to twelve days will be consumed in the ocean voyage, and the views of land obtained, headland and mountain ranges and volcanoes, can be located from the maps and by reading the guide for the local route. Also views of certain mountains can be had from this route that cannot be obtained from the close-to-shore route. In the latter route the low near-coast ranges hide the higher interior mountains.

With the exception of an occasional sight of land or of other vessels, the ship's company travels in a world of its own.

In some ways this route is preferable: to one who desires to make time; to one to whom two weeks at sea is long enough; to one who does not care for the varying scenery of the coast, the peculiar experience resulting from the landings, the swells or the surf.

After passing the southern end of lower California, these two routes are practically the same.

The Shore Route.

The time by this route would be probably four weeks, with a possible delay en route of one to five days, because of poor dockage at way ports, or bad weather.

The voyager who has the time to spare, and the disposition to use it, cannot do better than to take passage by the shore route. Passing out of the Canal, the vessel steams through Panama Bay, with its ancient and romantic history now crowded out by the present active life. Where the sailing vessels of the buccaneers used to tack against adverse winds, or "lay to" waiting for favorable ones to waft them to newer conquests, the

OCEAN ROUTES—(Cont'd).

present steamer "takes the bone in its teeth" and proceeds promptly on its way.

This route passes along the shore line from the time of leaving Panama until arrival at San Francisco, seldom more than one or two miles distant from land; in fact, hardly distant enough at sea to get views of the higher inland mountains. But the close view of the shore allows the passenger to distinguish the various local objects, and the kaleidoscopic changes of the landscape always provide entertainment.

The varying scenery and the strange sights and experiences combine to enlarge the horizon of one's life, and the longer time consumed on this coast route would seem to be well spent.

CHARACTER IN SAILING VESSELS.

Ship, any large sea-going vessel, especially a vessel equipped with bowsprit and three masts and square rigged.

Schooner, a sharp-built vessel with two, three or four masts, with fore and aft sails.

Bark, a three-masted vessel having fore and main masts rigged as a ship and mizzen mast as a schooner.

Barkentine, a three-mast vessel with foremast rigged like a ship main and mizzen like a schooner.

Brig, a vessel with two masts, square rigged forward and schooner rigged aft.

The Colors, Ensign, Flag, at stern.

Jack, a small flag containing the union without the fly.

Pennant, a long narrow piece of bunting carried at the mast head, usually contains the private sign of the company to which the ship belongs.

Flag, composed of "Union" (stars) and "Fly" (stripes).

TERMS ON SHIPBOARD.

Starboard ("Stabbard"), the right side of the ship.

Port (formerly "larboard"), the left side of the ship.

Quarterdeck, that part of a ship's deck extending from stem to mainmast.

Forecastle, that part of the upper deck of vessel forward of the foremast. In merchant vessels the forward part, under deck where sailors live.

Waist, that part of a ship between the quarter-deck and fore-castle.

Poop, a deck raised above the after part of the spar deck, reaching forward to the mizzenmast.

Hatchways, main and fore, openings in the deck for storing cargo.

TERMS ON SHIPBOARD—(Cont'd).

Masts, (fore and aft) are foremast, mainmast and mizzenmast.
Fore and Aft, from bow to stern.

Binnacle, a box containing a ship's compass and a light to show it at night.

Davits, arms projecting over side of ship, having tackle by which to raise or lower a small boat.

Beam, the extreme width of the ship.

Jacob's Ladder, rope ladder at side of ship.

Lee, that point or side toward which the wind blows.

Windward, that point or side from which the wind blows.

Stay, a large, long rope to support a mast.

Shrouds, large ropes leading to a mast.

Ratlines, rounds forming the ladder between the shrouds.

Bulkhead, a water-tight partition in a ship.

Deadlight, a strong shutter for a cabin window to exclude water.

Sextant, the sixth part of a circle; an instrument for measuring angular distances between objects, especially for observing the altitude of celestial bodies in determining latitude and longitude at sea.

Astrolabe, an instrument for taking the altitude of the sun or stars at sea.

Ephemeris, an astronomical almanac.

Freeboard, that portion of the side of a vessel or boat between the rail or gunwale and the water-line.

Barometer, an instrument for determining the weight of the atmosphere, changes of weather or height of an ascent.

Dead Ahead, directly ahead, as the direction of the wind.

Dead Reckoning, method of determining a ship's position without celestial observation.

THE SHIP'S OFFICERS.

The Captain is in supreme command, representing the three departments of government—legislative, judicial and executive.

The First Officer has charge of the handling of all cargo; also the cleanliness of the ship on deck, assisted by the Second and Third Officers, quartermasters, boatswains, carpenter and sailors.

The Chief Engineer has charge of engine room and all machinery, assisted by First, Second and Third Engineers, oilers, water-tenders, firemen, and coal passers.

The Purser has charge of the business end of the ship and is responsible for all stores, specie, correct receipt and delivery of cargo, and welfare of the passengers, assisted by freight clerk, stewards and waiters. He is also responsible for the baggage, but the direct handling is by the baggage clerk or the steerage steward.

THE SHIP'S OFFICERS—(Cont'd).

The Chief Steward has direct charge of all cooks, waiters, etc., and of all stateroom service.

The Second and Third Mates at sea are on the bridge, and in port are in the holds looking after the safe handling of the cargo.

The Second Mate is the navigating officer of all ships; he has charge of all clocks and chronometers and regulates the time by setting all clocks to the standard time of the port at which they are.

The Doctor answers only to the Captain and is called whenever needed.

The quartermasters' duties consist chiefly of steering. They keep the bridge and pilot house clean. In port, they stand at the gangplank and see that no undesirables board the ship and that nothing is stolen. Most ships carry four quartermasters, and there are two on watch at a time. Entering port, they set the flags and then heave the lead.

The boatswain is the mate's foreman. He receives his orders from the First Officer regarding all work to be done, and he assigns it to the sailors and sees that they do it.

In case of the Captain's death, the First Officer takes charge.

THE SHIP'S WATCHES.

In the navigation of ships at sea, the twenty-four hours of the day are divided into what are termed watches.

The names of the watches and their corresponding time are as follows:

Afternoon watch.....	12:00 Noon	to 4:00 p. m.
First dog watch.....	4:00 p. m.	to 6:00 p. m.
Second dog watch.....	6:00 p. m.	to 8:00 p. m.
Midnight watch.....	8:00 p. m.	to 12:00 Midnight
Middle, or Graveyard, watch.	12:00 Midnight	to 4:00 a. m.
Morning watch.....	4:00 a. m.	to 8:00 a. m.
Forenoon watch.....	8:00 a. m.	to 12:00 Noon

Statistics prove that more lives are lost at sea between the hours of midnight and 4 o'clock a. m. than during any other watch; hence the name of this watch.

The dog watch is what is called a split watch, being divided into two parts. If the natural order of the watches was followed, the same officer would go on watch at noon on each day. By splitting this watch, the officers alternate their watches on succeeding days.

One degree of longitude is equal to four minutes of time.

THE SHIP'S WATCHES—(Cont'd).

Log, an apparatus for measuring a ship's progress through the water. It is composed of a small fan-shaped machine attached to a long line. It is placed in the water and the line played out until it drops the required distance astern. As the ship proceeds, the fan is revolved by the resistance of the water and the revolutions are numbered by the part of the instrument attached to the line and remaining on board the ship.

Log book, a journal of the ship's progress, recording all matters of interest concerning the navigation of the ship and incidents of consequence aboard.

THE LEAD LINE.

Lead—(To Show the Way.)

The lead is composed of the weight and the line attached to it.

In navigating the ship through difficult passages or over shoal localities, the lead is used for the purpose of measuring the depth of the water.

There are two lead lines, the deep sea and the hand. The deep sea line is usually a small wire cable worked over a small wheel from the stern of the vessel. In shallow water the lead line is operated by hand. The quartermaster takes his place at the side of the vessel and throws the line, and his musical intonation, as the result is made known to the officer on the bridge, is one of the chief attractions of ship life.

In the bottom of the lead is a cavity. "Arming the lead" means placing tallow in this cavity to bring up specimens from the bottom of the water. In case of fogs or question of locality the nature of the bottom of the ocean assists the navigator to find his location.

These tallow records are kept with the other records of the voyage and are carried into the home port as part of the evidence showing the course of the ship. The measurements on the lead line are marked off by different colored cord tied around it. The distance between the cords is one fathom (six feet) and each color of cord indicates a specific number of fathoms. Taking soundings is called "heaving the lead."

In the hand lead there are nine "marks" and eleven "deeps."

The marks are 2-3-5-7-10-13-15-17-20 fathoms.

The deeps are 1-4-6-8-9-11-12-14-16-18-19 fathoms.

Seven fathoms are called "by the mark seven."

Six fathoms are called "by the deep six."

Five and three-quarters fathoms are called "and a quarter less six."

THE LEAD LINE—(Cont'd).

Five and one-half fathoms are called "and a half five."

Five and one-quarter fathoms are called "and a quarter five."

Two fathoms are called "by the Mark Twain"—hence the name by which the lamented American humorist-author and ex-pilot is known all over the English-speaking world.

NAUTICAL LANGUAGE.

Forward, instead of "up front."

Aft, instead of "out back."

Below, instead of "down stairs."

On deck, instead of "up stairs."

Avast, to stop.

Bearing, direction.

Between wind and water, at the water's edge.

Belay, to make fast, as with a rope; to stop.

Clew, to draw up to a yard as a sail.

Flow, the tidal setting in of water from ocean to shore.

Ebb, to flow back to the ocean.

Abeam, on the beam, at right angles to the keel.

List, thrown off of center, as by the shifting of the cargo.

BOXING THE COMPASS.

Can you box the compass?

Here are the thirty-two points. Commit them to memory so that they can be recited as fast as the tongue can travel:

North, nor' by east, nor'-nor'-east, nor'-east by north, north-east, nor'-east by east, east-nor'-east, east by north, east, east by south, east-sou'-east, sou'-east by east, south-east, sou'-east by south, sou'-sou'-east, south by east, south, south by west, sou'-sou'-west, sou'-west by south, south-west, sou'-west by west, west-sou'-west, west by south, west, west by north, west nor'-west, nor'-west by west, north-west, nor'-west by north, nor'-nor'-west, north by west, north.

MARINE ITEMS OF INTEREST.

5,280	feet one statute mile.
6,080	feet one nautical mile.
6,080.66	feet one statute knot, or
60	knots in one degree, and
360	degrees in a circle of the earth, or
21,600	knots in a circle of the earth, or
131,385,456	feet in the circumference of the earth.

WIRELESS EQUIPMENT ABOARD SHIP.

Under the United States marine law, ocean-going ships are required to carry wireless telegraphic apparatus capable of transmitting and receiving messages within a radius of at least one hundred miles.

This law applies to any passenger-carrying, ocean-going steamer carrying fifty or more persons, including passengers and crew, calling at American ports.

Each ship is required to carry an operator holding a certificate issued by the government. This operator must be able to receive messages at a speed of at least twenty words a minute. He must pass a rigid examination.

Exception is made in the case of steamers plying between ports not more than two hundred miles apart.

The Weather Bureau of the United States receives daily reports concerning the weather conditions from the masters of most of the North and Central American ships. The information so accumulated is of much value in making up the forecast of weather conditions along the Atlantic and Gulf coast lines.

FIRE DRILL ABOARD SHIP.

The United States navigation laws compel the fire drill on shipboard while at sea at least once per week.

The passengers are usually notified before the alarm, to prevent unnecessary excitement; but the crew is supposed to be caught unprepared. The ship's big bell clangs, the whistle blows and the members of the crew rush to their places. The captain is on the bridge, and the first officer is in charge of the deck. Each boat is in charge of an officer and the hosemen go to their stations. Water is turned on and the decks are quickly awash.

One man climbs into the life boat hanging at the davits and passes out the life belts, which are put on by the boat crew. These small boat crews are of a very picturesque and motley composition. Stokers, sailors, stewards and roustabouts all fall into their stations in just the state of wardrobe in which the alarm finds them.

When all boats signify their readiness, the first officer notifies the crew of the boat that is to continue the drill. The ropes of this boat are unfastened, and it is dropped to the deck level ready, if necessary, to take its load of passengers.

After the captain is satisfied with the drill, a signal is blown by the big whistle; everything is made shipshape again, the individuals return to their duties and the drill is over.

Under a section of the United States marine laws, one minute is allowed from the time of the fire alarm for water to be thrown from the hose, and two minutes are allowed for the lifeboat to be in the water.

SCOPE OF VISION AT SEA.

The distance at which an object at sea may be seen varies according to elevation, clearness of air, and intensity of illumination, but is about as indicated in the following table:

Height in feet	Distance in m.les	Height in feet	Distance in miles
5.	2.6	75.	10
10.	3.75	100.	11.5
15.	4.5	200.	16
25.	5.75	500.	26
50.	8.5	One mile.	95

Seven inches in height is allowed for the curvature of the earth in one mile.

A SHORT TREATISE ON ASTRONOMY.

In the lone watches of the night, whether one is at the camp fire of the plains or on the bridge of the ship at sea, the stars speak a language of their own to the one who can understand, just as they did those many hundreds of years ago when "The morning stars sang together and all the sons of God shouted for joy." Ever since men began to "go down into the sea in ships," the stars have been their steadfast friends, always on watch and always in the self-same place.

The navigator's first act on stepping into his watch, even before examining his compass, is to glance at the heavens, locating himself with the assistance of the stars, and also possibly offering a quiet greeting to some particular constellation that he has claimed for his allegiance for lo, these many years.

The quiet hours of the camp fire ashore or the great solitude of the night watch on the ship bring the stars down near the earth and they become companions and will remain so during all the succeeding years. In new and distant localities they change their apparent relation to each other, and succeeding months bring new, yet old, stars; but one year hence the same star will be seen in the same place in the heavens where it is tonight—its location unchanged through ages in the past will remain unchanged in the ages to come.

To a person who has been accustomed to study the stars from the north temperate zone, many interesting changes and remarkable differences will be noticed in the various constellations and groupings of stars when viewed from the tropics, and unless the reader has kept in touch with the nightly change that has occurred in the heavens during his progress southward, he will possibly have difficulty in recognizing old star-friends.

The North Star will lie close to the northern horizon scarcely eight degrees high, as the Isthmus is between seven and eight

A SHORT TREATISE ON ASTRONOMY—(Cont'd).

degrees north latitude. New stars and new constellations have made their appearances in the Southern sky and old friends among the stars and constellations have changed their faces until they also seem to be strangers, and the combination of local environments will apparently have brightened them.

If you have chosen that best time of the year, the winter season, for your trip, you will see the greatest and strongest star-effects. Orion, with its multitude of worlds, excels all other constellations in its beauty. Sirius, more than twice the largest star in the heavens, blazes in its glory. A new star, Canopus, second only to Sirius, has made its appearance, and when seen on the horizon has been mistaken for the light in a light-house; a Centauri and b Centauri are prominently bright, the second star being, of all stars, the nearest to our earth. While excelling all in prominence and interest and romance and beauty is the world-famed Southern Cross, with its four stars set in a diamond. The lower star is of the first magnitude, the east and north stars of the second and the west star of the third magnitude. This constellation can be first seen from the latitude of middle Florida, or the upper portion of lower California.

To the west of the Southern, or "True Cross," is the "False Cross." It resembles the "True Cross" in that it is formed by four stars set in a diamond as is the first, but the diamond is one-half larger in size.

When the study of stars was in its infancy, to get a footing to use as a means of comparison, the brightest star was said to be of the first magnitude and the less bright ones second, third, etc. But continued research introduced brighter stars. As the less bright stars were classed by numbers, making a second magnitude star less in size than the first, the larger stars were forced to continue the arithmetical progression downward, making a star larger than the first magnitude read smaller in ratio to its brightness.

This makes the understanding of the magnitude of the larger stars somewhat difficult to any but the professional mind. When one reads the magnitude of Capella is 0.2, it is difficult to understand it is almost double a first magnitude star in brightness, and when the reader goes on to Sirius with a magnitude of —1.6 he has to use pencil and paper to find how bright that star really is.

Appended is a list of the stars ranging above first magnitude. + indicates the position of the star in north latitude, and — the position in south latitude; as Vega, $+38^{\circ}42'$ means that star is over that *north* latitude, while Rigel, $-8^{\circ}8'$ means that star is in that location *south* latitude.

STARS OF LARGE MAGNITUDE.

Name	Magnitude	Location
Sirius.	—1.6	—16 degrees 35 min.
Canopus.	—0.9	—52 degrees 38 min.
Vega.	0.1	+38 degrees 42 min.
a Centauri.	0.1	—60 degrees 28 min.
Arcturus.	0.2	+19 degrees 38 min.
Capella.	0.2	+45 degrees 54 min.
Rigel.	0.3	— 8 degrees 18 min.
Procyon.	0.5	+ 5 degrees 27 min.
Achernar.	0.6	—57 degrees 41 min.
b Centauri.	0.9	—59 degrees 56 min.
Altair.	0.9	+ 8 degrees 38 min.

The following stars named in the above list—Canopus, Acherner, a Centauri, and b Centauri—are located so far south of the equator that they are not visible from the north temperate zone.

TIME AS TOLD BY THE SHIP'S BELLS.

The nautical day begins at noon.

1 Bell	12:30	4:30	8:30	a. m. or p. m.
2 Bells	1:00	5:00	9:00	a. m. or p. m.
3 Bells	1:30	5:30	9:30	a. m. or p. m.
4 Bells	2:00	6:00	10:00	a. m. or p. m.
5 Bells	2:30	6:30	10:30	a. m. or p. m.
6 Bells	3:00	7:00	11:00	a. m. or p. m.
7 Bells	3:30	7:30	11:30	a. m. or p. m.
8 Bells	4:00 {a. m. p. m.	8:00 {a. m. p. m.	12:00 {Noon Midnight	

In the striking of the bells, there is always a pause after the sounding of every even number of strokes.

SHIP'S SHORE SIGNALS.

One short whistle—call for small boat from shore.

Two short whistles—call for lighters from shore.

Three short whistles—call for cargo from shore.

Four short whistles—cargo loaded.

Five short whistles—call for ship's papers.

Three long whistles—call for steamer's launch from shore.

(B)

THE BUCCANEERS OF THE PACIFIC.

In the days of the exploration of the Pacific coasts of Central and South America, the ships of Spain and England appeared to alternate in the local conquests. In fact, one explorer seemed to no more than discover and explore and exploit to his own advantage a certain locality and pass on to new fields of conquest than the representative of another king set up his standard and continued the exploration and exploitation. Then individual crews or combinations of ships took up the business, until the line of demarcation between legitimate cruising, as demonstrated by authorized explorers, and illegitimate cruising, as carried on by bandits, pirates and buccaneers, became lost.

The history of the quest of these fortune hunters for treasure and the records of their efforts in its attainment were marked by a trail of blood and destruction extending from Magdalena Bay on the north to the islands and harbors of South America. And the result was that neither country nor town escaped these depredations, nor is there a harbor nor an island that was not used as a rendezvous by these pioneers of adventure and crime.

Sufficient for this work is the above statement of fact, and the reader who is desirous of information relating to the exploits of these men may find much of interest while en route along these coasts.

COCOS ISLAND

AND ITS LOST PIRATICAL TREASURE.

Cocos Island is located in $5^{\circ}33'$ north latitude and 87° west longitude.

Anything said or written concerning the buccaneers and their life along the Pacific shores of the Americas would be incomplete without mentioning Cocos Island and the treasure that report says is buried there. All shorewise localities, from Maine to Brazil on the Atlantic and from British Columbia to Terre del Fuego on the Pacific, have their local legends as to buried treasure and midnight visits of strangers whose efforts to unearth these long-lost valuables cause much local excitement among the inhabitants. In all the treasure trove literature, no story stands out more prominently than the one of Cocos Island.

The location of this island is about five hundred miles west and south of the Gulf of Panama. It belongs to the republic of Costa Rica. From the various tales handed down by legend and otherwise, the following seem to be the main facts:

COCOS ISLAND—(Cont'd).

In the years bordering on 1820 or 1830, being in fear of a raid from pirates, the good people of Callio placed the movable wealth of their city on a ship. The crew of this ship murdered the guards, as per the fashion of the day, and set sail, aiming to safeguard this treasure to its own advantage and profit.

They sailed for Cocos Island and landed and cached the loot. The authorities pursued and captured the crew and hanged all but the captain and one man, whose lives were spared on condition that they would locate the cache for their captors. But the two escaped and joined Bonito, another buccaneer.

The new pirate combination looted Acapulco, and again visited Cocos Island and hid this treasure. Then a British war vessel captured the pirate vessel, and that captain escaped by offering to turn king's evidence.

The special information concerning the treasure was transferred from one sea-dog, or "beach-comber," to another and various efforts have been made to locate the treasure, one effort being in a way successful. In this case the men quarreled about the division of the spoils while on their way to the ship in the small boats; the boats were capsized, the treasure lost, and all but one man drowned, and he died a few months later.

Different efforts have been made by treasure hunters, including well-fitted expeditions, to unearth these caches, and even in modern days the newspapers tell of expeditions being formed for this purpose, all of which adds to the halo of romance that crowns the shores and islands of these coasts.

GEOGRAPHICAL CONFIGURATION OF CENTRAL AMERICA

The geographical configuration of Central America follows the general outline of North and South America. The western portion is high table land containing mountain chains whose general trend follows the line of the coast. The eastern coast is lower and contains swamps and marshes.

The western coast line is bold, rocky and abrupt; the eastern, low, marshy and swampy. Few sections have been thoroughly explored, and vast stretches of both mountains and low land are a blank in the history of civilization as known at the present day.

The mountain chains of western Mexico contain cloud-piercing peaks; Guatemala, Salvador, Honduras and Nicaragua likewise contain rugged mountains.

Volcanoes.

The Pacific coast of Central America is well populated by volcanoes which by general reports are divided into three classes—active, sleeping and dead.

Volcanoes follow the line of the coast, and in Salvador and Nicaragua they practically form groups.

As the chain of land connecting North and South America becomes narrower, the mountains become reduced in height, and in places natural passes occur between the Atlantic and Pacific Oceans. The Tehuantepec, Nicaragua lakes, Panama, San Blas and Darien proposed canal routes are such locations or passes.

BAY OF PANAMA.

World-wide travelers have said that for beauty, the view of Panama City from the bay can hardly be surpassed by that of any other city in the world.

The various islands in the bay, combined with the encompassing shore-line, form a fit setting for the scene.

Leaving the entrance to the Canal, the Pearl Islands are off to the southeast, while Taboga and the lesser islands are before us and the break-water with Flamingo Island and its hidden fortifications are in the rear.

COAST OF PANAMA.

From Panama City to Cape Mala the course of the ship is south. After passing this cape, the ship's course veers to the west for a distance of sixty miles until Mariato Point is reached. This is the most southern point of the trip, the location being close to seven degrees north latitude. From Mariato Point to Burica Point the course is northwest. Here the coast line recedes, forming quite a bay, called David Bay.

DAVID CITY.

David City is an important Panaman city, the capital of Chiriqui Province, and is situated ten miles inland. It is located on the proposed route of the Pan-American Railroad. At one time it was hoped that the construction force of the Canal, on the completion of that work, would be transferred and used in building the railroad from David City to Panama City, but this failed to transpire.

Burica Point may be seen in clear weather for a distance of thirty miles and marks the boundary between Panama and Costa Rica.

GULF OF PANAMA.

From Cape Mala on the west to Pinas Point on the east the distance is about 100 miles, and from a line connecting these points to the interior shore-line it is about as far. The water so enclosed constitutes the Gulf of Panama.

The approach to the Pacific entrance of the Panama Canal has been carefully surveyed by the authorities. A wire drag

GULF OF PANAMA—(Cont'd).

was used in exploring the water. This drag consists of a long cable held up at intervals by buoys, from which hangs a parallel cable. This second cable was placed at a depth of forty feet below sea-level, and the drag was towed slowly through the water. When an obstruction was encountered, an examination was made and its character determined. This drag exploration has included all the water for a distance of 150 to 200 square miles, and all hidden dangers have been carefully charted.

Immediately off the entrance of the Canal and connected by the big break-water are the islands of Naos, 170 feet high; Culebra and Perico, each 330 feet high; and Flamenco, 350 feet high. Flamenco Island, in other days, was called Dead Men's Island, as it was the burying ground of former days. The greater number of graves were of persons who died aboard ship, en route or at anchor in the bay. Many were the victims of yellow fever. These bodies have all been transferred to Ancon Cemetery.

Taboga Island and the two small islands of Urava and Toboguilla are ten miles south of Panama. Taboga is the largest and is two miles wide by four miles long and its highest elevation is 935 feet. It is well cultivated and has a village on its northeast side. The sanitarium of the Canal Commission is located here, and is such a pleasant place of abode that it is said along the line of the Canal it almost reconciles a person to his illness when he is located on Taboga. Taboga is also known widely and favorably because of its success in the cultivation of pineapples.

The Pearl Islands are located thirty-five miles southeast of Panama and some twenty miles off shore. The group comprises fifteen or twenty islands. The largest is Rey Island, seven miles across and fifteen miles long. There are about 3,000 inhabitants on these islands, who are engaged in pearl fishing. The pearl shells are also an article of commerce.

The movement of sailing vessels in the Gulf of Panama is peculiarly difficult because of uncertain winds, continued calms and opposing currents, as the experience of Pizarro related in a previous chapter clearly indicates. Pizarro experienced this difficulty when, after beating around in Panama Bay for seventy days, the victim of calms, doldrums and vexatious winds, he was forced to return to port.

The best way to succeed in sailing north is in first sailing south across the "Line," or equator, and getting into the southeast trade-winds, then sailing west until favorable northern winds are found. For steamers the usual route to the north is as close in shore as is safe because of a prevailing ocean current of considerable strength running to the north along the shore.

COSTA RICA.**Facts.**

Established by Spaniards in 1500.

Joined Federation of Central American States in 1824.

Federation dissolved in 1839.

Capital, San Jose.

Most industrious and law-abiding nation of Central America.

No revolution in years.

Atlantic coast generally low.

Pacific coast high.

Inland; mountains, plateaus, and volcanoes.

Climate, tropical, often fever stricken on coasts. Temperate and healthful on the plateaus.

Soil, extremely fertile.

Valuable woods.

All tropical fruits.

Rich in agricultural possibilities.

Produces one-half the world's supply of bananas.

Called "Banana Republic."

Rich in gold and silver and other minerals.

An entrance tax of two cents per pound is charged on all baggage brought into the country.

Mountains.

Rincon da la Volcan Viejo, (active) eight miles from San Jose.

Orosi, two peaks, 5,200 and 6,700 feet high.

Aguacate.

Barba, 9,300 feet high.

Poas, 8,700 feet high.

Turrialbe, 11,000 feet high.

Irazu, 13,000 feet high; one-third distance inland from Pacific coast; from its summit either ocean can be seen. Cartago, a city of five thousand inhabitants, was destroyed in 1911 by this volcano, with great loss of life and property.

Coast.

The entrance to the Gulf of Dulce lies between Banco Point on the east and the high point of land on the west called Matapala Head, and is some eight miles wide. The gulf extends inland about thirty miles, and the water is deep.

Llorena Point is the high point of land at the western extremity of the peninsula enclosing the Gulf of Dulce.

Sal si puedes point ("sail if you can") is high and precipitous and is easily recognized by a natural terrace behind it.



Map of Costa Rica, Nicaragua, Honduras, Salvador and Guatemala.

From Llorena Point the coast curves to the northwest for a distance of seventy-five miles to Judas Point, and from this point the course leads almost directly into the Gulf of Nicoya. Judas Point on the east and Cape Blanco (white cape) on the west mark its entrance. The Gulf of Nicoya extends inland fifty miles, and contains many islands.

Punta Arenas is on the eastern shore, half way up the gulf.

PUNTA ARENAS.

Punta Arenas ("point of sand") is the only town of importance on the Pacific located in Costa Rica. It is situated on a point of sand on the eastern side of the gulf. All communication with the shore is by lighters or small boats.

A visit ashore will prove to be of interest.

Punta Arenas is connected with the Atlantic coast by a railroad that crosses the country to Port Limon. The forwarding of mail will be expedited by making the address read "via Port Limon and New Orleans" and posting it at this point, thereby preventing its being held for the next southbound boat and carried to Panama to be forwarded. Telegraph and cable service are also possible from this port.

On shore may be seen what might be called the municipal bath house. This bath house is set above the water on piles driven into the sand. The piles are surrounded by netting intended to safeguard the bathing of the people by preventing the entrance of sharks and other undesirable visitors.

Sharks, jellyfish, gars and catfish may be seen in the water, and a line of fish hooks will help to furnish amusement for the passengers.

LIGHTERS.

Lighters are broad flat-bottomed boats or barges and are used for the purpose of transferring heavy freight between ship and shore. They are capable of floating from eight to fifteen tons weight and are manned by a crew of seven to eleven watermen, according to the size of the boat and the surf conditions. The lighters are propelled by long oars or sweeps in the hands of the crew, the men alternating along the sides of the lighter. The crew is in charge of one of their number, who is the captain and who stands at the stern and guides the lighter, using his sweep as a rudder.

The poetry of motion is exemplified by these men in handling their sweeps while propelling the empty lighter. The stroke is begun with the man standing at the height of the gunwales and as the stroke advances he descends into the boat, the finished stroke finding him standing near the bottom of the lighter. In recovering the stroke he steps to his place at the height of the gunwales. This movement of the men is rhythmical and in unison.

CAYUCA.

A boat dug from the body of a corkwood or other light tree. It is the favorite small boat of the native. The watermen are especially expert in its manipulation, the passenger and the oarsman each standing while in transit, riding the waves with perfect equipoise.

Leaving the Gulf of Nicoya, Cape Blanco marks the point to the west, whence the course is northwest past Guionos, Cape Velas, Port Culebra with its fine harbor, to Cape Elena, the latter, one of the most striking features of the coast, being a narrow, high, rocky peninsula some two miles long, extending directly into the sea.

PAPAGAYOS.

Prevailing and troublesome winds out of the Gulf of Papagayo, called "Papagayos," may be encountered. Their limit is usually confined to the coast between Cape Velas on the south and Cape Desolado on the north, a distance of one hundred miles. These winds occur during certain seasons of the year in the region opposite Lakes Nicaragua and Managua. They are caused by the opposite atmospheric conditions of the Atlantic and Pacific coasts, combined with the low pass in the mountains (150 feet in height), and also by the two large lakes that lie between. The two coast lines are only 150 miles apart.

From Cape Elena the land trends almost east, forming the Bay of Salinas. The boundary between Costa Rica and Nicaragua enters this bay.

CHUBASCOS.

Chubascos are violent winds with heavy rains accompanied by thunder and lightning, occurring in and around the Gulf of Nicoya.

NICARAGUA.

Facts.

Discovered in 1500.

Declared independence from Spain in 1821.

Joined Central American Federation in 1833.

East coast, low and swampy.

West coast, bold and rocky.

Contains many volcanoes, all crowded together.

Pacific shore line, 175 miles long.

Largest of Central American Republics.

Greatest in natural resources.

Poorest in available assets, due to continued political troubles and revolutions.

NICARAGUA—(Cont'd).

Population, mixed Spanish, Indian and Negro.
Great forests of hardwood.
Great mineral deposits.
Principal exports, coffee, sugar and products of the mines.
Money ratio, ten to one.

Mountains.

In Nicaragua will be found extremes of geographical configuration. It contains many volcanoes and a chain of large lakes.

Lake Nicaragua, 40 miles wide, 100 miles long.

Lake Managua, 25 miles wide, 50 miles long.

VOLCANOES.

Ometepe (active), 5,700 feet high, 27 miles inland in Lake Nicaragua, often hidden by dense volumes of smoke; situated directly back of San Juan del Sur; the highest mountain in Nicaragua.

Viejo, 5,650 feet high, visible 50 miles at sea.

Momotombo (active), 4,000 feet high, in Lake Managua, when seen from sea appears as an immense isolated mountain.

Coseguina; tremendous eruption in 1835, sand falling in Jamaica, Mexico and Venezuela; visible seventy miles at sea.

Santa Clara.

Telica, cone of extremely regular outline.

Oroto.

Las Pilas.

Axoco.

Assoco.

Madera.

Momotombito in Lake Nicaragua.

Rota.

San Jacinto.

Masaya or Popocatepec.

Mombacho, 4,300 feet high, on shore of Lake Nicaragua.

Coast Line.

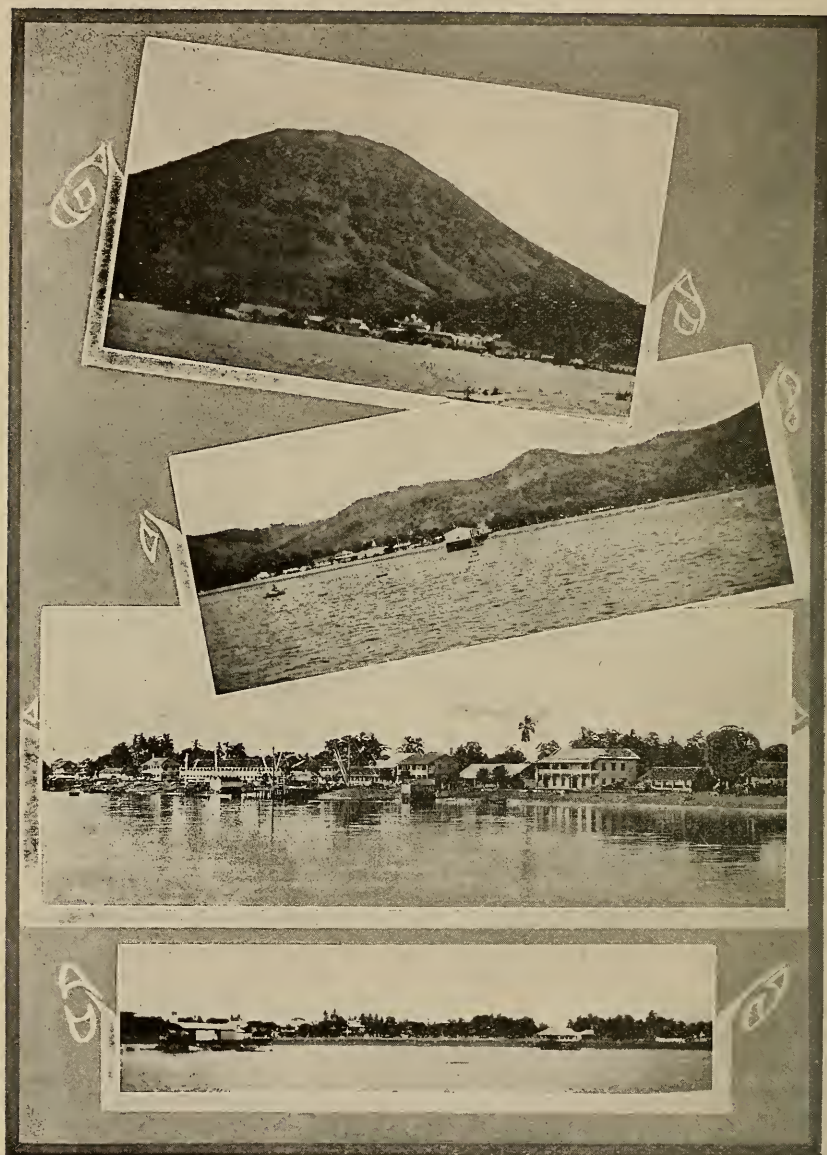
The coast line of Nicaragua extends from Salinas Bay in the Gulf of Papagayo to the Gulf of Fonseca, in a northwesterly and southeasterly direction, a distance of 175 miles.

The coast from Salinas Bay to the Port of San Juan del Sur, a distance of 14 miles, is high and rocky.

PORT SAN JUAN DEL SUR.

(St. John of the South.)

This port is practically on the open shore and all freight and passengers are transferred by means of lighters or small boats.



- (a) Amapala, Honduras.
- (b) La Libertad, Salvador.
- (c) Corinto, Nicaragua.
- (d) Punta Arenas, Costa Rica.

NICARAGUA—(Cont'd).

BRITO.

The Pacific entrance of the proposed Nicaragua Canal was at Brito, seven miles northwest of San Juan del Sur.

There is no harbor at Brito, and it was intended to form one by means of jetties and excavations.

Cape Desolado is 70 miles northwest of San Juan del Sur, and is a prominent headland. The coast continues in the same general direction to Corinto, a distance of 50 miles.

CORINTO.

Corinto becomes an important port in the mind of the passenger, as it is, in fact, of the republic of Nicaragua, because the ship enters the harbor and proceeds to wharf. The passenger has the opportunity to step off ship, steady his feet on terra firma and fill his lungs with shore air.

The population meets the boat on its arrival, and the wharf merchant displays his wares and is ready for business. Fruits and vegetables may be bought, and native drinks from calabash cups may be sampled. These calabash cups are the general dining room and kitchen ware of the native Central American household, and are of all sizes and many have designs neatly carved on their backs. They make a pretty souvenir and are cheap.

Corinto is an old town, replete with history, and will be found to be quite interesting. A railroad connects it with the interior. The small size of the engine and rolling stock is fully offset by the bustling way in which it hustles about its work.

A walk through the town and a glimpse in the stores will pass the time profitably and a meal at that noted hostelry, the Corinto Hotel, may not be amiss. The proprietor of this hotel is well worth an acquaintance, and he can give many interesting reminiscences—if he can be prevailed upon to talk. Many noted characters have stopped with him and his experiences with them have not all been to the good credit of the traveler.

An army post and band are located here and the national spirit of the country can be studied at close range.

Corinto has had her part in making much history, in insurrection, fevers and what not, and one interested could gather many curious scraps of history well worth his time and trouble.

The harbor lies so peacefully in the evening air that the mountains and line of vegetation on the farther side are mirrored on its surface; or, just as probably, the storms come, and all nature may be in a turmoil.

Corinto being such an important port, the ship may remain a day or possibly two. Time may be had for a short trip up the railroad; if so, it would well repay the effort.

The quarantine laws of the Canal Zone do not deal kindly with Corinto. Ships laying at the dock at Corinto after sun-down may not enter a United States port for eight days thereafter, consequently, the north bound ship remains at wharf during the night, while the south bound ship due at Panama in less than eight days leaves the dock at sun-down and anchors in the bay, returning at sun-up of the succeeding day to complete its cargo.

Many volcanic peaks may be seen from Corinto, one of which at least, Momotombo, is active.

Coseguina Point is 40 miles northwest of Corinto, and Coseguina Point marks the turn into the Gulf of Fonseca. The boundary line between Nicaragua and Honduras enters the Gulf of Fonseca a short distance after rounding Coseguina Point.

Nicaragua, with its mountains containing many volcanoes, is populated with a similarly volcanic people. If the inhabitants could settle down to the necessities of business and make good use of the natural resources of their country, their prosperity would be wonderful.

HONDURAS.

Facts.

Capital, Tegucigalpa.

Rich in natural wealth but undeveloped because of continued warfare.

Government established in 1838.

Climate, semi-tropical.

GULF OF FONSECA.

The entrance to the Gulf of Fonseca is located between Coseguina Point on the east and Amapala Point, twenty miles away on the west. Coseguina Point is in Nicaragua and Amapala Point is in Salvador, and the coast line of Honduras lies inside the headlands of the gulf, and between the boundary lines of these two countries.

The gulf extends inland twenty-five miles, and has a width varying from twenty-five miles at the southern portion, to almost double that at the northern end. There are many islands of varying importance in the gulf. The depth of water ranges from deep to shoal. Sudden squalls of wind, and what might be called draughts through the mountains and between the islands, combined with troublesome currents, make extreme caution necessary by navigators. To these difficulties may be added sunken rocks and wrecks of ships at the entrance.

Honduras has one port of call, Amapala.

AMAPALA.

Amapala is beautifully located on Tigre Island, at the base of a dome-shaped mountain. The ship anchors in deep water, and here again lighters and small boats are the means of communication with the town.

Go ashore if possible. The experience will be worth the effort. Probably the Government will be represented at the wharf by soldiers, for the people of Honduras and especially Amapala are a martial people.

The town is an old one, and is well built. The buildings are scattered along the shore from the barracks on the left to the fort on the hill on the right. The stores front the water, and small purchases can be made. To the right is the school. You may enter if you wish, and witness the method of training the young Honduran mind. Further to the right is a public park enclosed by an iron fence, and filled with strange plants and trees. It contains a band-stand and a large statue of one of the national heroes.

The United States and Honduras have had so many misunderstandings that the former usually keeps a gunboat in the harbor. Any old-timer on shipboard or ashore can relate much history that will be of interest.

This port, as well as La Union, across the bay, makes a specialty of tortoise shell ornaments and combs. By careful bargaining the passenger may be able to make a satisfactory purchase.

After a few hours spent in this harbor, and with a fairly complete knowledge of the difficulties of its navigation, the quartermaster's call of the lead will have a new significance as he sings "Mark Seven. Quarter less Seven. One-half Six," with the long drawn out word and the short explosive number.

SALVADOR.

Facts.

Became independent in 1842.

Sixty miles by one hundred forty miles in extent.

Most densely populated of Central America republics.

Capital, San Salvador.

Second city, Sonsonate.

More than one-half area is volcanic mountains.

Products—coffee, bananas, sugar and minerals.

Mountains.

The mountains of Salvador do not extend in chains, but occur in clusters of peaks or groups.

The Isalco group comprise the following:

Isalco, (active) 6,300 feet	Naranjos.
high, 18 miles from Corinto,	Aguila.
can be seen, although higher	San Juan de Dios.
peaks are behind it.	Apaneca.
Marcelino	Tamajaso.
Santa Ana	Lagurita.

The San Miguel group comprise the following:

*San Miguel, (active) 7,000	Usulatan.
feet high, perfect cone.	Tecape.
Chinaneca.	Tabureto.
Buenapa.	

The San Salvador group comprise the following:

San Salvador, (active) 5,700	San Vincente, 7,000
feet high, visible sixty	feet high, truncated
miles at sea.	cone.
Cojutepeque.	

The City of San Salvador was destroyed by volcanoes in 1594, 1658, 1710 and 1854. It is always in danger.

Coast Line.

The coast line of Salvador extends from the Gulf of Fonseca, including the town of La Union, to the La Paz River, a distance of 160 miles. The coast line is a belt of low rich land, ten to twenty miles in width, backed by a table-land containing a high range of mountains.

Salvador is a country of volcanoes, dead, sleeping and active. To a person in passing, it would seem that this whole section of Central American Coast, from Mexico to Costa Rica, was in process of formation. Earthquakes are frequent; volcanoes ever-present; storms either possible or probable, and along this section of the coast from La Union to Acapulco, a distance of several hundred miles, there is no harbor of safety. Even in a calm, the sea is in motion. Along this section of the coast are experienced the swells. These swells are not waves but a successive raising and lowering of the surface of the water, varying in magnitude according to local conditions, until in some localities life on a ship at anchor becomes a misery. (See page 124.)

During the season of storms, no landings can be made and no communication with the shore can be had, and if a severe storm arises while the ship is on this coast, the only port of safety is the open sea.

*Note: San Miguel is one of the most treacherous of burning mountains in America. After several years' repose it may suddenly burst into fury.

LA UNION.

La Union is on the opposite side of the Gulf of Fonseca from Amapala and the short voyage is very interesting, as the ship passes between islands through narrow channels so close to land on either side that their strange vegetation is in good view.

La Union is said to be the hottest town along the coast, because it is located on the shore of the gulf and is enclosed from the sea breezes by mountains on all sides.

The ship anchors out in the bay, because of mud-flats, and communication with the shore is by means of lighters. Here, again, tortoise shell ornaments are featured.

Passing out of the gulf, going past Conchagua volcano and Amapala Point, the trend of the coast line continues northwest to the Port of La Libertad, a distance of eighty-five miles.

LA LIBERTAD.

La Libertad is but an open port, exposed to the full effects of wind and water at all seasons of the year and in bad weather no shore communication can be had. It is the port of the City of San Salvador, twenty-six miles inland, with which it is connected by a good wagon road. It is also the sea resort for the elite of that city, whose season of gaiety is not considered complete without spending a "moon" in surf bathing on the beach at La Libertad.

An improvement in the general conditions of water traffic is made by the use of a little tug that blusters back and forth.

Passengers are landed over the ship's side into the lighters by means of a two-seated box, capable of carrying four persons. It is lowered and raised by the blocks and tackle of the ship. The same system is used at the wharf, making the transfer of passengers interesting and sometimes exciting.

Thirty miles up the coast from La Libertad is Acajutla.

ACAJUTLA (pronounced Acahootla).

Acajutla, connected by railroad with the interior cities of Sonsonate and San Salvador, is an important port of export. This port is also an open roadstead, dangerous in rough weather. It is located on one of the main arteries of commerce into the republic of Salvador and the movement of passengers and freight is important.

This section of the coast has a history of earthquakes and wrecks. The old town of Acajutla was situated two miles east, before it was destroyed and the channel of the river filled up.

The remains of the steamer Colon may be seen, and other wrecks have occurred on Point Remedios, to the right of the town.

The La Paz River marks the boundary between Salvador and Guatemala and is ten miles west of Acajutla.

LUNAR RAINBOW AT SEA.

Tropical storms come and go, and local conditions are so unusual that strange phenomena may be seen.

A storm on the horizon with the full moon on the opposite side of the heavens may give a view of a lunar rainbow. During the month of January, 1911, one of exceptional brilliancy was seen while the writer was sailing off the coast of Salvador.

A light shower had fallen, but had passed west and the full moon was rising in the east. The bow, with colors so strongly marked that they were individualized, seemed to be set on the sea with one foot of the arch in the northwest and the other in the southwest, extending almost to the meridian without a break in its broad bands. The ship appeared to be sailing straight into its center, while the admiring passengers, loathe to leave such a beautiful sight, gathered on deck.

The lightnings of an electric storm among the mountains on shore, playing through the clouds, the reflection of volcanic fires on the under-surface of the clouds, the storm at sea in the west, the clear sky overhead and the full moon on the eastern horizon made a picture that it will be difficult to efface from mind.

The law of the lunar rainbow is the same as that of the sun; i. e., a line drawn from the moon, or sun, on a line with the eye of the observer, will, if extended, pass through the center of the rainbow.

SWELLS OF THE PACIFIC OCEAN.

Along this section of the coast are experienced the swells of the ocean. These swells are not waves, but rather a successive raising and lowering of the surface of the water. In some localities this movement is so pronounced as to interfere with the regular life on the boat. The ship, after anchoring, swings lengthwise to the swells. As the successive swells approach the ship, it swings to meet them, passes over them to a perpendicular and swings down on the other side to right itself in the valley and prepare to swing again. The motion is so pronounced at times that one has to grasp a fixture of the ship to keep upright. Since some anchorages are held from twelve to thirty-six hours, as made necessary by the hours of business, the effect on the internal workings of the body can be understood.

The United States pilot books warn against the effect on passengers and crew, and suggest a double anchorage, bow and stern, across the line of the swells, in order to steady the ship.

PORPOISE.

The porpoise is found in all salt waters of the tropical and temperate zones. It is sociably gregarious in its habits and is usually seen in small herds. It frequents the shore line rather than the open sea, coming into rivers and small bays. It is called the sea-hog by sailors, and grows to the normal length of a man. It may be seen gamboling along the course of a ship as if enjoying company.

Coming out of Champerico during a late voyage, the passengers were called to the bow of the ship to see, as the sailors said, "the porpoises scraping the barnacles off their tails with the bow of the ship." There below, plainly to be seen in the clear water, were three large porpoises swimming side by side just in front of the cut-water of the ship, as active and busy as though it was their duty to pilot the boat through the water, while on each side were other porpoises tumbling along on the surface of the water as though the whole fleet were out on a lark.

The officers said that the porpoises always accompanied the ship out of this harbor in that manner.

GUATEMALA.

Facts.

Became independent of Spain in 1823.

Joined Central America Federation in 1824.

Regained independence in 1851.

Population 2,000,000, of which 1,000,000 are full-blood Indians, 800,000 are half-breeds and 200,000 are people of property.

The native population is poor and in debt continually.

Soldiers receive four cents per day.

Laborers receive nine cents per day.

Climate along the coast is tropical and that of the interior is temperate.

Mountains.

Guatemala with its 125 miles of coast line furnishes fifteen or twenty volcanic peaks.

Fuego, (active)	13,000 feet high.
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Pocaya, (active)	12,000 feet high.
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Atitlan, (active)	
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Quesaltenango,	9,500 feet high.
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Tajunuelco,	
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Vulcan de Agua ("water"), 13,000 feet high, in 1841 destroyed old City of Guatemala by deluge of water; source of water probably a craterial lake.

Santa Maria,	12,500 feet high.
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GUATEMALA.

Coast Line.

The coast line of Guatemala extends from the La Paz River to the boundary of Mexico, a distance of 120 miles.

From Remedios Point near Acajutla to west of the Gulf of Tehuantepec, this coast has no harbors. It is a continuous sandy beach. In case of rough weather the only rule for a ship is to put to sea. What with a rough surf-line ashore and a continual swell afloat, life is uncertain in its comfort going or coming.

The republic of Guatemala should be specially felicitated because of its national hymn, which will rank with the similar composition of any country on earth.

San Jose, Champerico and Ocos, the three ports of Guatemala, are open roadsteads off a sandy coast composed of long sand islands thrown up by the waves and backed by long narrow lagoons.

SAN JOSE DE GUATEMALA.

San Jose is Guatemala's chief export city. It is connected with Guatemala City by railroad. The high mountain range contains many volcanoes. Agua and Fuego volcanoes are of special interest.

The town sustains an electric light plant.

CHAMPERICO.

The port of Champerico is worked by surf boats, assisted by small tugs. The passengers are placed in the lighters by the "Pacific Coast Elevator," as the box is called, and pulled up on the pier in the same manner. A railroad extends a few miles into the country, and assists very materially in the importance of the port.

The swells become more noticeable here, and special care is taken to insure safe anchorage by the use of two anchors or at least having the second one ready to drop in case of an emergency.

SHARKS.

Sharks are plentiful in all tropical waters, and they may be seen and caught along the Central American coast.

Different methods are used in their capture, not the least interesting being that of shooting. As the ship rides at anchor, a piece of fat meat is fastened to a string and allowed to drop over into the water and float a short distance away. The fisherman (or hunter) takes his place at the rail. A quick eye, and a quick finger at the trigger are necessary. The water being clear the approach of the shark may be easily seen. The shark

SHARKS—(Cont'd).

approaches the meat, probably in big sweeping circles, possibly passing swiftly out of sight to return again.

If he desires the meat, he raises to it and turns on his side, his mouth being set under and back of his nose. The moment he reaches for the bait is the opportune time. A moment too soon or too late loses the game.

The only objection to this sport is that in case of success, the fish is lost, as it sinks at once.

Considering the continual movement of the bait and the ship, because of the heavy swells, the swift circular approach of the game, its quick turning on its side as it prepares to seize the bait, and the brief second of exposure as it reaches the surface of the water, the hunter may feel chagrined, but not necessarily humiliated, if his shot is unsuccessful.

A permit for shooting should be secured from the Captain, as shooting may conflict with laws either aboard ship or ashore.

SNAKES.

Snakes are seen in the waters off shore. They are probably washed down from the rivers.

TORTOISE.

Many large tortoise are passed at sea as they float along the surface of the waves. Combs and other ornaments are manufactured from the shell and may be bought at the ports along the coasts of Nicaragua, Honduras and Guatemala.

MACKEREL.

Schools of mackerel abound along the coast.

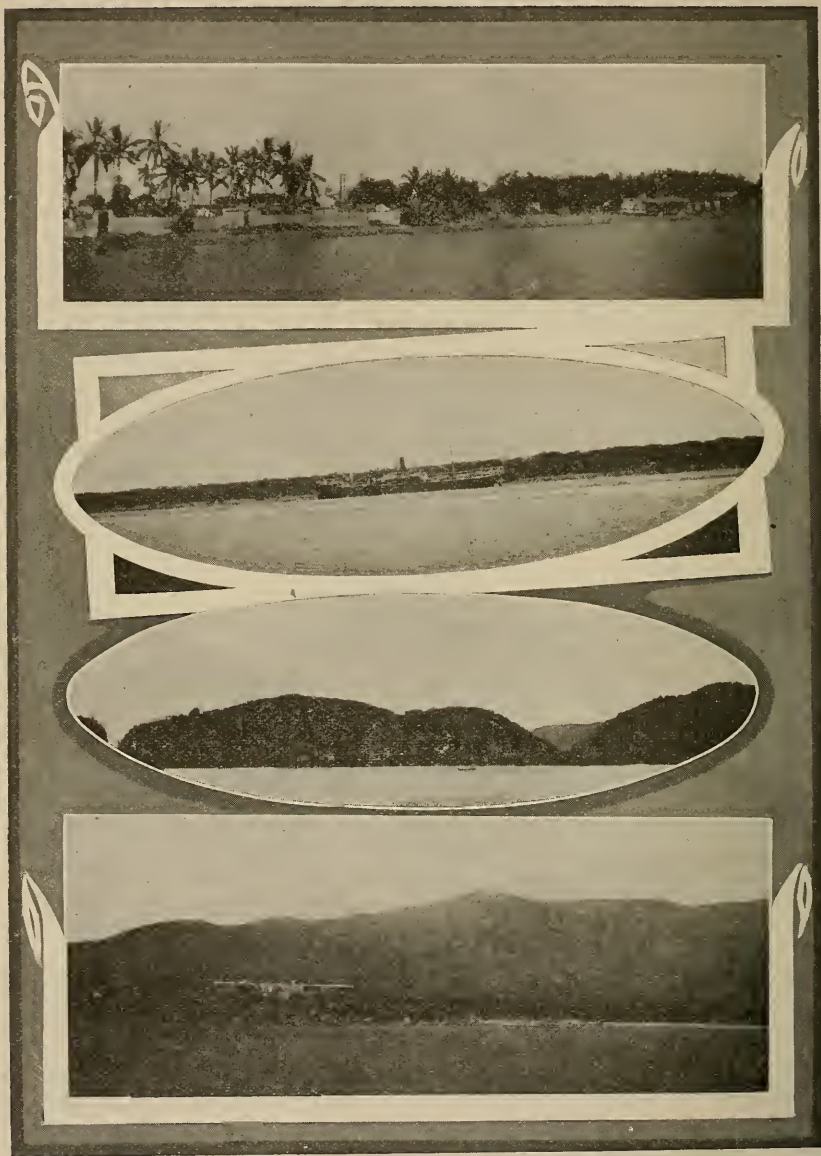
The mackerel is a pelagic, carnivorous fish, widely distributed and extremely abundant, peopling in countless schools the tropical oceans. Mackerel have elegantly shaped, well proportioned bodies. No other fish show finer lines.

PILOT FISH.

The pilot fish is a pelagic fish of the horse mackerel family and gets its name from the sailors, because of its habit of keeping company with ships and large fish, especially sharks. It is probably a foot long.

Sailors say a shark never seizes a pilot fish, depending on it to show the way to its food, the shark's eyes being so placed that it is at a disadvantage for sight. It is said the pilot fish swims under the head of the shark.

Shooting along the coast from ships is allowed in all Central American countries, if the permission of the Captain of the ship is obtained. Mexico, however, has a law against the discharge of firearms within the three-mile limit.



(1) Mazatlan, Mexico. (2) Wreck of the "Sosostres" (page 129).
(3) Manzanillo, Mexico. (4) Fort San Diego, Acapulco, Mexico.

OCOS.

At Ocos the boat anchors near the buoy to which the endless cable is attached and swings lengthwise to the swells. Ocos is a small collection of houses sitting on the beach, but is an important port of export. Much of the coffee shipped from Guatemala passes through this port.

Here is the most picturesque wreck along the coast. In 1909 the German ship, "Sosostres," of Hamburg, on her first voyage, a stranger along a strange coast, arrived at this anchorage. She was 375 feet long and fifty feet wide, full rigged and with a full complement of officers and crew.

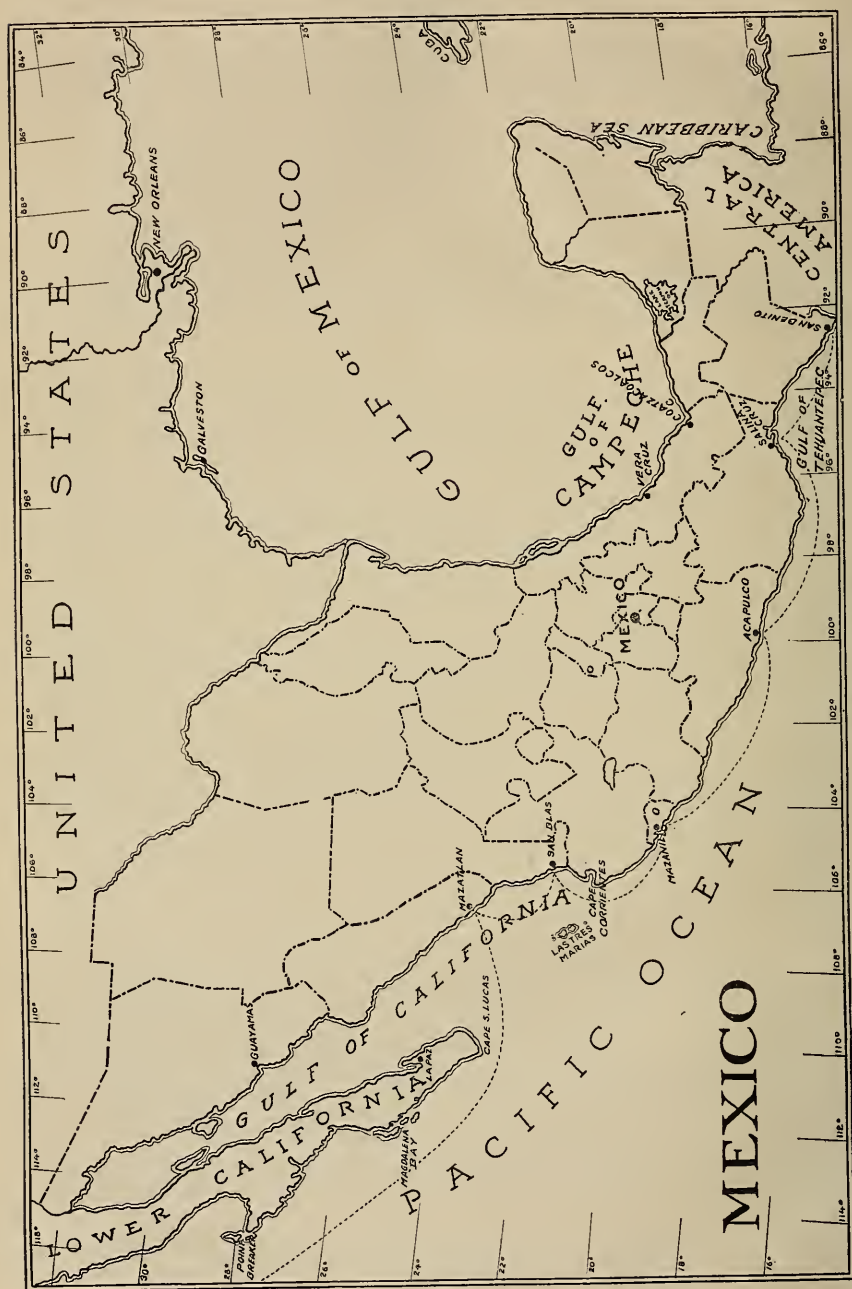
The night was calm, the moon shone brightly and the waters apparently held no danger. The ship anchored, and the crew, proceeding to take advantage of so peaceful a coast and so propitious a time, drew the fires for the purpose of cleaning the boilers.

Night came and peace yet reigned. All retired except the watchman, who slept without retiring. The giant swells soon came into their own, for the continual movement caused the cable to slip its anchor. The first alarm was given by the ship itself when it drifted sidewise onto the shore and its keel began to pound on the sandy beach. Too late the crew sprang to their places. There was no power on board, nor at sea, nor ashore, to prevent the progress of the ship toward the beach. Each swell put her further in-shore, until she now rests upright 200 or 300 feet inland, a complete steamer on an even keel, sails at yards, small boats at davits and all the ship's furnishings in their proper places—an object lesson to the maritime wayfarer, pointing to the first lesson of success in various walks of life, as well as to liberty—eternal vigilance, which is the price of safety as well as successful progress on land or on sea.

The result in this case was a loss of a quarter of a million dollars' worth of ship, the cargo and crew being saved.

The underwriters paid the loss, and after unsuccessful attempts to float the vessel, sold it as it stood to a citizen of Mexico City for \$10,000.00 gold. He has it attached, as it stands in the sand, broad-side to the sea, with cables to anchors embedded off-shore, arguing that "some day" a tidal wave may come, and if it does come it might wash the ship to sea, thereby using the force that caused the vessel to run aground to also set the ship afloat. It would seem that there are dead game sports, and persons who are willing to take a long shot at the game, located in all parts of the world.

About ten miles west of Ocos is Tacana Volcano, 14,000 feet high. The boundary line between Guatemala and Mexico passes over its summit.



Map of Mexico.

MEXICO.

Facts.

Pacific coast line, 4,200 miles long.

Under Spanish rule from 1521 to 1821, or for 300 years.

From 1821 to 1869, internal wars.

From 1869 to the present day, a republic.

Western coast mountain ranges.

Central portion plateau.

Few volcanoes.

Contains mountain peaks 17,000 feet high.

Mexico was inhabited by people of advanced civilization when discovered by the Spaniards. This people had a written language, lived in large and permanent cities, in houses built of stone.

Mountains.

The mountains of Lower California are not high, but the country is dry and parched and barren. The Coast Range of the United States continues down this peninsula to its end.

The Rocky Mountain Range of the United States continues down through Mexico as the Sierra Madre del Sur, and contains some of the highest ranges and peaks of the western hemisphere.

Along the coast the ranges and high peaks are always in view, usually fronted by ten or twenty miles of low coast, then by upland and then come the ranges, thirty to sixty miles away.

Colima, flanked by Safa, just back of Manzanillo, has late history, and the two mountains occupy a wonderfully beautiful setting along the high peaks of the range. (See page 138.)

North of Acapulco, the mountains raise in the distance in successive ranges until, thirty miles from the coast, they are 12,000 feet high. The ranges drop at the Isthmus of Tehuantepec, raising again to the high mountains of Guatemala, Honduras and Nicaragua; Mt. Tacana, on the line between Mexico and Guatemala, being 14,000 feet high.

Coast Line.

The Mexican coast line extends from the Guatemala boundary northwest to that of the United States, near San Diego, California, and is 4,200 miles long. The route of coast travel takes one along this coast to Mazatlan, from which port the steamer turns a little south of west to cross the mouth of the Gulf of California, rounding the lower end of Lower California before changing again to the northern course. Changes of climate, scenery and civilization have occurred with the boat's progress.

MEXICO—(Cont'd).

In Mexican territory, marine laws are more strictly enforced, and the visits of the port doctor and the customs officer become more ceremonious.

The voyage across the Gulf of California to the southern end of Lower California is something like fifteen hours' ride and the water is two miles deep.

Cape San Lucas is the first land approached after crossing the Gulf and is a prominent point crowned by a lighthouse whose tower is fifty feet high. The light is 265 feet above water and can be seen twenty-five miles at sea.

To the right of the Point, the rocks extend into the Gulf and form an archway through which the water rushes and the rocks beyond can be seen. Three or four miles bring the ship to Cape Falso, the southernmost point of Lower California. Here, as at other places along the coast, on turning an exposed point of land on the way north, the old and experienced traveler looks for a change in the weather because of the new northern exposure. If this change has not been experienced up to the time of clearing the lower end of Lower California, changes are likely to occur regularly thereafter. The low coast is almost out of sight, and the ship becomes independent of the coast line. If the captain expects fair weather, he puts to sea to make a direct route; if he expects foul weather, he hugs the shore, taking advantage of shore islands and channels.

At night, changes will be observed in the celestial world, the Southern Cross and other southern stars each night becoming lower on the southern horizon, and by the time that the International Boundary is passed they have disappeared from view. When the coast of California, with its vivid green hills, finally appears in view, one feels that he has passed almost into another strange country instead of having just returned to his own land.

From Point Sur the coast of California, with its high, rocky shore and green valleys and little villages, is seen. The days and nights are made more pleasant, it is hoped, by the retrospect of an enjoyable voyage, and the prospect of an early arrival in the home port of San Francisco.

If the weather allows, the ship's course will probably be laid outside of San Clement and Catalina Islands off the lower coast of the state of California, and outside of the Santa Barbara channel. But if the barometer is falling and the weather conditions indicate a rough sea, the course of the ship will probably be set inside these islands and up through the Santa Barbara channel.

SHIP'S COURSE IN DETAIL.

San Benito, Mexico.

On leaving Ocos, San Benito, twenty miles north, is the first port of call in Mexico. It is but a small collection of thatched bamboo houses, containing two or three Chinese stores and the warehouse of the Steamship Company. Quite an extensive export trade, principally coffee, is conducted through this port.

Surf boats, or lighters, are used to communicate between ship and shore, and the method is unique. There is an endless wire cable attached to a buoy anchored out in deep water and to a stationary engine ashore. The lighters are drawn up on the sand inside the line of surf, and loaded and covered with tarpaulins. The waves break and wash over the sand beyond the boat. At times the boat is on the sand and at other times is waist deep in water. This, however, makes no difference to the men carrying the freight.

Two men in the warehouse lift the bag of coffee, weighing probably 150 pounds, and lay it across the shoulders of a third man, who moves off to the lighter, either on dry sand or hip deep in water, as the condition of the waves makes necessary. Two other men standing at the shore end of the lighter lift the burden from his shoulders and place it on the lighter, where it is properly located by the men aboard. The men care nothing personally for the water, expending their energies to keep the cargo dry. When the lighter is loaded and the cargo covered, the cable is placed in grooves over the bow and stern of the lighter and held in place by pieces of rope wrapped around the cable and held taut by members of the crew.

The man in charge takes his place in the stern and they are ready for the voyage through the surf to the ship; but more than the readiness of these men is necessary for the safe navigation of these waters. They must take advantage of an opening in the surf when it appears. The captain in charge holds two flags, one black to take the lighter to sea, and the other white to bring it ashore.

The waves are scanned for the opportune opening. Suddenly the black flag is held aloft. The man in charge of the engine opens the throttle, the cable starts, and the lighter is pulled into the surf. Possibly the time is right; as probably it is wrong; the chances may be too great, the waves too strong; down comes the black flag, up goes the white flag; the engineer reverses the movement of the cable and the boat runs back to the shore—ahead of the dark green, wicked-looking waves that curl their tops sometimes double the height of the lighter and its load. But perhaps the time is right and the lighter proceeds and is soon surrounded by this maelstrom of water, swinging

from one side to the other, but always advancing, with the slap of the waves on its bow and sides and with the spray flying along and sometimes over the lighter.

Soon the surf is passed and the boat moves on out over the smooth surface of the swells to the buoy. The black flag is dropped, the cable stopped and cast off the lighter, while the men get their long sweeps over the side and row to the ship.

The trip from ship to land is not so exciting for the lighter, after picking up the cable, and the white flag is raised, follows the waves, plunging through the surf and is soon bumping on the sandy beach.

The passenger going ashore is landed over the side of the ship and into the lighter by means of the "Pacific Coast Elevator" (*i. e.*, the box).

If he follows the custom of the native, after being deposited in the lighter, he perches himself on the side of it with the green water just below; but when through the foaming waters of the surf and the end of the lighter rests on the sand, the passenger is not safely ashore. The waves come and go, and when they go the sand is bare, but when they come—well, three feet will hardly measure their depth. The answer is read in the eyes of the boatman. If you want help, choose your man, and at once if you would clear yourself of any implication of being a stranger to such a situation. Choose a broad-shouldered, tall, good-natured fellow. Signal him and he will do the rest.

He will come to the bow of the boat and if you are a woman you will be carried safely to the dry sand. If you are a man he will "back up" to the bow and expect you to get on his shoulders with a foot on each side of his neck. He will walk through the water, drop on his knees upon the dry sand and you are at liberty to walk off to your explorations.

The return is made in reverse action. When you are ready to return you signal your man and he comes to you. If you are a woman you will be carried safely to the lighter; if a man, he drops down on his hands and knees behind you, sticks his head between your knees and begins to rise to his feet. All you have to do is to keep the center of gravity over the base of support. This may not be as easy as it sounds, as you are compelled to get higher upon his shoulders as he gains the perpendicular. The operation is always a matter of concern to the boatmen, and if you are slow, thereby hampering the carrier in his efforts, they will all join with him in crying: "Arriba! Arriba! Senor" (Higher! Higher! Sir!), being well-meant advice intended to assist you in gaining the perpendicular in your efforts to form the central picture of the situation.

After the rider becomes firmly located in his seat the carrier starts off at a swinging pace over the sand toward the lighter. The close proximity of the big green waves breaking at his feet,

combined with their generally angry aspect, and the unsteady seat which the rider occupies, are all a possible cause of uneasiness in the mind of the inexperienced. As they near the lighter, the big waves, curling higher than the rider's head, would seem to engulf horse and rider, but the waterman strides on in complete disregard of their nearness, well knowing that they will break at his feet and curl on up the beach. He approaches the lighter from the stern, taking advantage of the comparatively quiet waters to be found there, and stops at the side of the lighter. The men standing there assist the rider into the lighter and he climbs into the place at the stern away from the dashing spray, as instructed by the captain, not being quite sure in his mind that having passed through one apparent danger he has not placed himself in front of a greater one; but the captain raises his black flag, the engine starts, the cable pulls at the lighter, which, with its cargo, is off into the midst of the turmoil of waters. After the first few moments he begins to enjoy the excitement and he will possibly be sorry when he finds the lighter is out on comparatively quiet water and his unusual experience of passing through the surf on the Central American coast is at an end.

Salina Cruz.

Salina Cruz is located on the inner line of Tehuantepec Bay. It is an important town and has many improvements intended to assist the shipping of the port. While formerly very unhealthy, it now has a modern system of sewerage and water and an electric light plant. The port is protected by a breakwater and is a landing of the submarine cable.

It has railroad communication with Coatzacoalcos on the Atlantic coast and is located at the Pacific entrance of the at-times proposed Tehuantepec ship railroad.

The Isthmus at this point is 140 miles wide.

Crossing the Gulf of Tehuantepec.

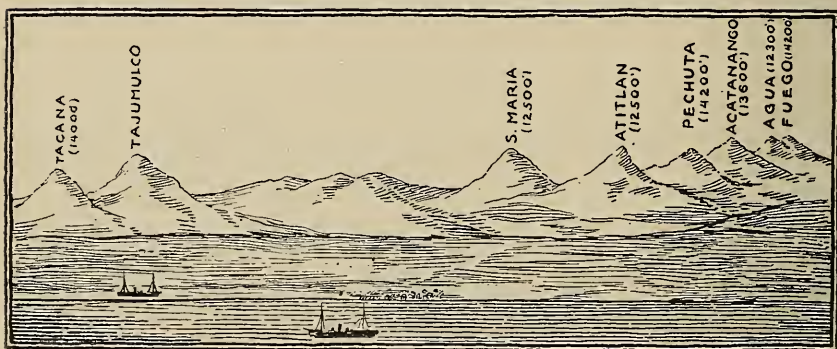
Whether the traveler goes into the port of Salina Cruz or crosses the gulf directly from point to point, he will probably have good reasons for recollecting the Gulf of Tehuantepec.

All the way from Panama, when you are either complimenting the good weather or naming the bad, the old traveler will say, "Yes, but wait until we cross the Gulf of Tehuantepec." You wonder what is meant. You are now in a position to find out. The days and nights may have been of the best, but the crew now begins to make the ship "ship-shape." Down come the awnings, all loose ends are tightened, and the ship prepares for a visitor. You will recognize its approach. If at night, by the rolling of the boat, the whistling of the wind, the beating of the waves, and the flying of the spume. If you have prepared

yourself by the only recipe for escaping sea-sickness, *viz.*, a clear conscience and an empty stomach, and if you are a good sailor, you may escape a visitation from mal-de-mer, and be able to go to the table for regular meals.

Anyway, the winds and waves kick up a “beastly nawsty sea” at best, and all are relieved in mind and body when the ship sails behind a headland, the winds cease and the waves lose their motion. The awnings are replaced, the ship proceeds on its way and the passengers return to the deck, and this is “crossing the Gulf of Tehuantepec.”

The cause of all this disturbance is found in the fact that the Atlantic coast line approaches to within 150 miles, the mountains decrease their height, and the differences between the atmospheric pressures of the two coast lines are caught in their effort to adjust themselves to a common level. In other words, the ship has passed through a draught and the passengers have suffered accordingly.



Ocos Mountain Range.
(From a sketch made on the scene.)

From the Gulf of Tehuantepec to Acapulco.

From the Gulf of Tehuantepec to Acapulco the mountain scenery is of unusual interest. The mountains are back twenty-five or thirty miles from the coast and are composed of successive ranges and peaks.

This country is almost altogether unexplored, and travelers tell of a strange Indian tribe, whose unusually beautiful women have light-colored hair, and they recount a shipwreck of years ago, which left the sailors on this shore. The castaways remained and married into the Indian tribes.

Acapulco.

The light at the entrance to Acapulco Harbor is placed 375 feet above water and is visible twenty-five miles at sea.

Acapulco is a beautiful harbor one mile wide and two and one-half miles long, surrounded by high mountains, causing the locality to be very unhealthful. A cut has been made through the hill on the left of the town to the ocean, to let in the sea breeze, which has to some extent raised the standard of health considerably above that formerly experienced.

After passing from the ocean into the harbor through the narrow entrance flanked by the high hills, the ship proceeds to the left, up the bay and anchors before the town. It will be surrounded by rowboats, the boatmen patiently waiting for the doctor and customs officer to perform their duties, after which bedlam breaks loose in the close competition for business.

Acapulco is interesting historically and commercially. In the days of Spanish world-supremacy, this port was on the high-way between the Philippines and Spain. Treasure was brought here, carried on mule-back to Vera Cruz on the Atlantic and thence by ship to Spain. Fort San Diego, on the right shore, was built for the protection of the harbor, and should be visited. It has an ancient moat, a drawbridge, heavy stone walls and all the paraphernalia of a fortress of the middle ages.

Drawn-work is the feature of this place. It was taught originally by special teachers brought from Ireland. A visit among the shops will please the ladies, and the prices asked will not displease the men.

Acapulo has suffered greatly from earthquakes, and ruins from their effects may be seen on all sides.

The phosphorescence of the waters in the bay is very unusual in brightness and the movements of fish can be traced by means of these lights, which are so strong that shadows are cast on the upper works of the ship. The waters of this bay, with all their beauties, hold hidden dangers, as is realized when it is understood that all books of authority always give the caution that this bay is infested by man-eating sharks.

Cape Corrientes.

We now approach Cape Corrientes (Cape of the Currents). This is a shoulder of high land reaching out into the ocean. Travelers of experience along these coasts will speak of turning different northern exposures and of the general consequences as to the weather.

Each prominent outpost exposes the ship to the influences of winds and currents as governed by the northern exposure. Cape Corrientes is no exception to this rule, but rather accentu-

ates it. The coast line trends more to the north, and the currents of water and air are more influenced by northern temperatures.

A lighthouse is located on Cape Corrientes 275 feet above water, and its light may be seen twenty-four miles at sea.

Leaving Cape Corrientes, the shore line swings to the East, entering Banderas Bay.

Las Tres Marias Islands.

Las Tres Marias Islands ("The Three Marys") lie fifty miles off shore, and about the same distance ahead, from Cape Corrientes.

These islands are high and rocky in formation, and were formerly the headquarters of the buccaneers.

The first island to the south is Cleopha, four miles in diameter; the second, Magdalena, eight miles long; and the third, Maria Madre, is twelve miles long.

Mexico uses these islands for a penal settlement. The chief export is salt.

San Blas.

San Blas is located on an open shore and has little protection from the storms. The government has built piers and breakwaters to add to the safety of the port. It has an unhealthful location, surrounded by swamps, and during the rainy season is infested with swarms of mosquitoes. It is the port for the city of Tepic, a thriving town of several thousand inhabitants, thirty miles inland.

San Blas was formerly a town of importance, but the railroads have reduced its trade. The ruins of the old town, a mile inland, are worth a visit.

Colima and Safa Volcanoes.

IMPORTANT—Do not miss the opportunity to see these volcanoes. If the ship passes them in the night time, they should be just as interesting.

Colima is an active volcano, 12,300 feet high.

Safa is a sleeping volcano, 14,600 feet high.

They are so located, with the range of low mountains in front, that the view of their forms and peculiarities is unobstructed from base to summit. They are at first in line, and appear as one mountain, but later, as the ship advances, they separate and Colima shows itself the smaller, for all its height, being over-topped by Safa, located three miles further from the ocean.

Colima volcano is twenty miles north of the city of Manzanillo. These volcanoes will form a beautiful picture as seen from the ship and should not be missed. They each have well-rounded, symmetrical forms, and at certain points along the coast stand alone as in a frame.

The thin smoke line of the active volcano gives no idea of its dangerous character, for as late as 1912 it destroyed several towns and much life and property.

Safa volcano usually has snow on its summit.

After leaving Apaculco and having passed the volcanoes of Colima and Safa, Manzanillo is the next port of consequence.



Colima and Safa Volcanoes.
(From a sketch made on the scene.)

Manzanillo.

Manzanillo is the port of the Mexican state of Colima and has railroad connection with the City of Mexico. The sound of the engine-whistle and bell is quite pleasant after the days of isolation, and one begins to feel the approach of civilization. The opening to the left through the hills was made for the railroad, while the opening to the right leads to a long slough, along which is the old town of Manzanillo. If time will allow, a visit to the old town will repay.

In all of these Mexican towns, tortoise shell ornaments and drawn linen lace-work are special attractions to the ladies, and if one is interested in such, she can here satisfy her desires at a ridiculously small expense, especially if her native ability in bargaining accompanies her.

Mazatlan.

Mazatlan is an open port and no place for a vessel in heavy weather. The ship anchors two or three miles from the city, surrounded by islands, rocks and wrecks.

The trip to town should be taken because of its interest and because of the six days at sea that stand between Mazatlan and San Francisco. A modern power boat will quickly land you at the wharf after an interesting ride.

Mazatlan is the second seaport in importance in Mexico. It has the appearance of an Oriental city, with its sea wall, palms, and church towers.

It has railroad and telegraph connection with the world; telephone system, electric lights and a street railway. It has large business houses, a market house and a cathedral. Drawn-work and tortoise shell ornaments may be purchased.

Whenever there is an earthquake or revolution in Mexico, Mazatlan is always heard from.

CORDONAZOS.

Los Cordonazos de San Francisco are hurricanes occurring occasionally in the Gulf of California. They are short of duration and of tremendous force.

Lower California.

The peninsula of Lower California extends from 22° north latitude to 32° north latitude, forming the Gulf of California on its east.

It contains Magdalena Bay on the west coast—a safe harbor so large that the fleets of the world could ride in safety. [See page 142.]

Its geographical location gives it a value to which it would never be entitled by its resources.

The peninsula commands the gulf, the adjacent shores of Mexico and the mouth of the Colorado River.

It is a land of no charms, and has little arable land. It consists of bare rocks, ravines and hills. There are few streams and no rains.

Its interior is nearly blank on maps and less is known of its geology and geography than any other region of equal area in North America.



Oaxaca Mountain Range.
(From a sketch made on the scene.)

Gulf of California.

A near approach to this almost unknown body of water, so far as the general traveler is concerned, would not be appreciated if some of its special characteristics were not mentioned. The gulf is from 100 to 200 miles wide and extends from 23° to 32° N. latitude or through a distance of 9°.

Its west shore is rocky and mountainous and the waters are deep, the depth at its mouth being about two miles.

It has local hurricanes, and the two seasons—wet and dry—but little water falls during the wet season.

The waters abound in fish of nearly every species of the world, in greater numbers and larger size than anywhere else in the world. They are of great beauty and brilliancy of colors. Swordfish of unusual size are found, and have been known to attack boats and leave their swords in the hull. Sharks of many species abound in the bays and harbors, and some have been captured that weighed to exceed 1,000 pounds. They are very ferocious.

A fish called bull's-eye is found in these waters. It is a species of sun-fish, and has but one eye—the size of a bull's—set in the center of the upper part of the body.

A species of ray, the Manta raya, an immense fish of great strength and ferocity, is also found here. Records tell of one being captured that was 17 feet wide, 11 feet long and 3 feet through. It has a large and formidable mouth, extending almost the width of the animal, and sports a tail which is armed with a spine. The octopus (8-armed) devil-fish, or cuttle-fish, is found in these waters. It is a gigantic mollusk that hides along the rocky shores watching for its prey. Its long, prehensile arms are furnished with suckers with which it seizes and enfolds its prey. Its head contains a sharp bill with which it is able to dissect and devour its prey. Its arms are from 10 to 20 feet in length.

On shore the rattlesnake is the chief characteristic. It is found everywhere and in great numbers. It seems to be one of the great laws of nature to preserve the general equilibrium in life. Therefore, there never is an influx of unusual conditions without nature producing its buffer; so with the snake question. The unusual number of poisonous snakes do not appear without also the antidote for their poison being at hand.

A small vine with pink and white flowers, called gollingrina, grows everywhere. A tea made from it and taken internally, and a poultice from it applied to the wound, are said to effect a sure cure.

A species of the cactus (pitahays) is also considered able to effect a cure for rattlesnake bites.

It is said tarantulas and scorpions do not exist in Lower California.

Magdalena Bay.

Magdalena Bay is situated on the west coast of Lower California, just south of Cape San Lazaro. The oblong island of Santa Margarita lies partly in front of the bay.

It is a magnificent bay of vast extent. The climate is salubrious, the water placid. Its coast is sterile and fresh water is scarce. It is sheltered from high winds by lofty mountains.

It formerly was a rendezvous for smugglers.

It is a harbor of safety for large fleets. The United States has used it for fleet target practice.

There have been rumors of foreign nations desiring its acquisition for a coaling station.

Magdalena Bay is seventeen miles long and twelve miles wide, over an area of 100 square miles that exceeds five fathoms in depth. It connects by a channel a mile wide with Almejas Bay, a large bay lying to the south, and with a series of lagoons, extending sixty miles toward the north. The entrance to Magdalena Bay is three and one-half miles wide and the channel is two and a half miles wide, with no hidden dangers.

San Clement Island.

San Clement is an island south of Catalina Island, off the California coast, opposite Los Angeles. It is barren and without inhabitants except shepherds in charge of sheep herds. It has always been especially attractive to students of antiquity and anthropology because of the fragments of remains indicating its ancient occupancy by the human race.



Lunar Rainbow at Sea.
(From a sketch made on the scene.)

AFT-WORD

Whether the reader has taken the tour outlined between the covers of this book or has used it as a text-book and not read it from the viewpoint of a tourist, if he has digested its contents carefully and understandingly, he will have a much better and more connected idea of the general conditions geographically, financially, etc., of the countries lying between North and South America and of their relation to each other and to the world at large than before he opened the book.

Great and important questions of government and of business will come before the proper authorities for settlement in the next decade. Knowledge of distance, relative locations, new routes of trade, the wants of new markets, the laws of demand and supply—all call for a broad-minded understanding of cause and effect.

The high-grade business man will study local conditions and will try to fulfil their necessities, thereby increasing his business. He will also attempt to satisfy the buyer. Local conditions make peculiar shipping necessities. Traffic through the surf to the shore and then inland by mule-back or man's back has influence on the size of the package and its durability of construction. European shippers appreciate these laws of trade, and attempt to satisfy the local necessities. American shippers will benefit by a study of the same conditions.

The business in tropical countries is done in a dignified manner—no haste and plenty of courtesy. The American shipper tries to rush the customer as has been his custom to rush through the business day at home. Here again the European business man understands trade conditions better, and has succeeded where all national advantages are in favor of the American merchant or manufacturer.

No people have greater advantages of location, machinery, or general ability than the American; yet they fail by seemingly not being able to sense the advantageous way of approaching the customer, or of packing their goods in a proper way for forwarding.

Their prevailing sense of superiority is also strongly against their success in dealing with their Southern neighbors.

Reading and travel are the great educators. If you have read this book understandingly and have traveled the route outlined in it, it is the hope of the author that your mind has developed and your ideas advanced to the mutual advantage of yourself and of your Southern neighbor. If you have read the book, but stayed at home, it is hoped you feel your time and the expense of the book have not been misspent.

If any proper questions concerning the Canal, the Zone and the republic of Panama, as well as the coast line leading from Panama City to San Francisco, have not been answered within the covers of this book, the author will consider it a personal favor to him if they are sent to him; and he will agree to answer them, if competent to do so, and if not competent, he will agree to study the subject and find and forward the proper answer.

He has had great pleasure in compiling the contents of this book, and if some proportion of this pleasure should descend to the reader, he will feel well repaid for his efforts.

THE AUTHOR.

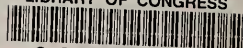
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